VOL. LXXI AUGUST, 1927 NEW SERIES VOL. 24, No. 5

JOURNAL
of the
American Veterinary Medical Association

FORMERLY
AMERICAN VETERINARY REVIEW
(Original Official Organ U. S. Vet. Med. Ass'n.)
EDITED AND PUBLISHED FOR
The American Veterinary Medical Association

CONTENTS

Editorial 549
Applications for Membership 556
Coming Veterinary Meetings 559
Papers:
Ostertagia Ostertagi in California Cattle, with Copper Sulphate an Apparently Successful Therapeutic—E. H. Barger 560
Meat and Milk Hygiene—Louis A. Klein et al 568
Flies, Their Pathogenic Importance and Extermination—Oscar Glueck 574
Bang Bacillus Disease (Bovine Infectious Abortion)—M. F. Barnes and A. L. Brueckner 578
Factors Influencing the Control of Bacillary White Diarrhea—F. P. Mathews 585
A Comparison of the Agglutination Test and the Intradermal Test in the Detection of Bacillary White Diarrhea—Philip R. Edwards and Floyd E. Hull 590
An Improved Antigen for the Agglutination Test in Bacillary White Diarrhea—W. L. Mallman 600
The Possible Role of Radiant Therapy in Demodectic Mange—John G. Hardenbergh and Charles Sheard 607
Is There a Dipteron in the Ointment?—Ward Giltner 618
Handling and Disposing of Reactor Cattle—E. P. Schaffter 624
Two Interesting Turkey Diseases—Erwin Jungherr 636
Clinical and Case Reports:
Correcting Paralyzed Drop-Foot by Ankylosing Operation—Jacob Lebiah 641
Herniotomy in a Boar—H. S. Lames 642
Echinococcus Cysts in the Liver of Hogs—Harry Morris 643
Reviews 646
Abstracts 648
Army Veterinary Service 651
Miscellaneous 653
Commencements 659
American Veterinary Medical Association
Minutes of Meeting of Executive Board, Chicago, Ill., December 1, 1926 661
Association Meetings 665
Necrology 682
Personals 683

LIBRARY N. C. STATE COLLEGE AUG 5 1927

THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION is issued the first of each month. *Manuscripts and copy for insertion should be as nearly perfect as possible for the printer and should be received by the tenth of the preceding month to insure insertion in the next month's issue.* Volumes begin in April and October.

Communications relating to publication, subscriptions, advertisements and remittances for the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, as well as matters pertaining to the American Veterinary Medical Association and membership, should be sent to Dr. H. Preston Hoskins, Secretary-Editor, 716 Book Bldg., Detroit, Mich.

$4.00 per annum Foreign $5.00; Canada $4.25 Single Copies 40 cts. in U. S.

Entered as Second-Class Matter, March 15, 1923, at the Post Office at Detroit, Mich., under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917; authorized October 26, 1918.

FOWL CHOLERA & TYPHOID MIXED BACTERIN

Made by Dr. A. A. LEIBOLD

The two diseases, Fowl Cholera and Fowl Typhoid, are frequently confused, as they resemble each other somewhat. Our Fowl Cholera and Typhoid Mixed Bacterin is used with great advantage in these cases where an absolute diagnosis cannot be made. In this way immunity is produced against both and the veterinarian is saved much time and annoyance. It is a reputation builder.

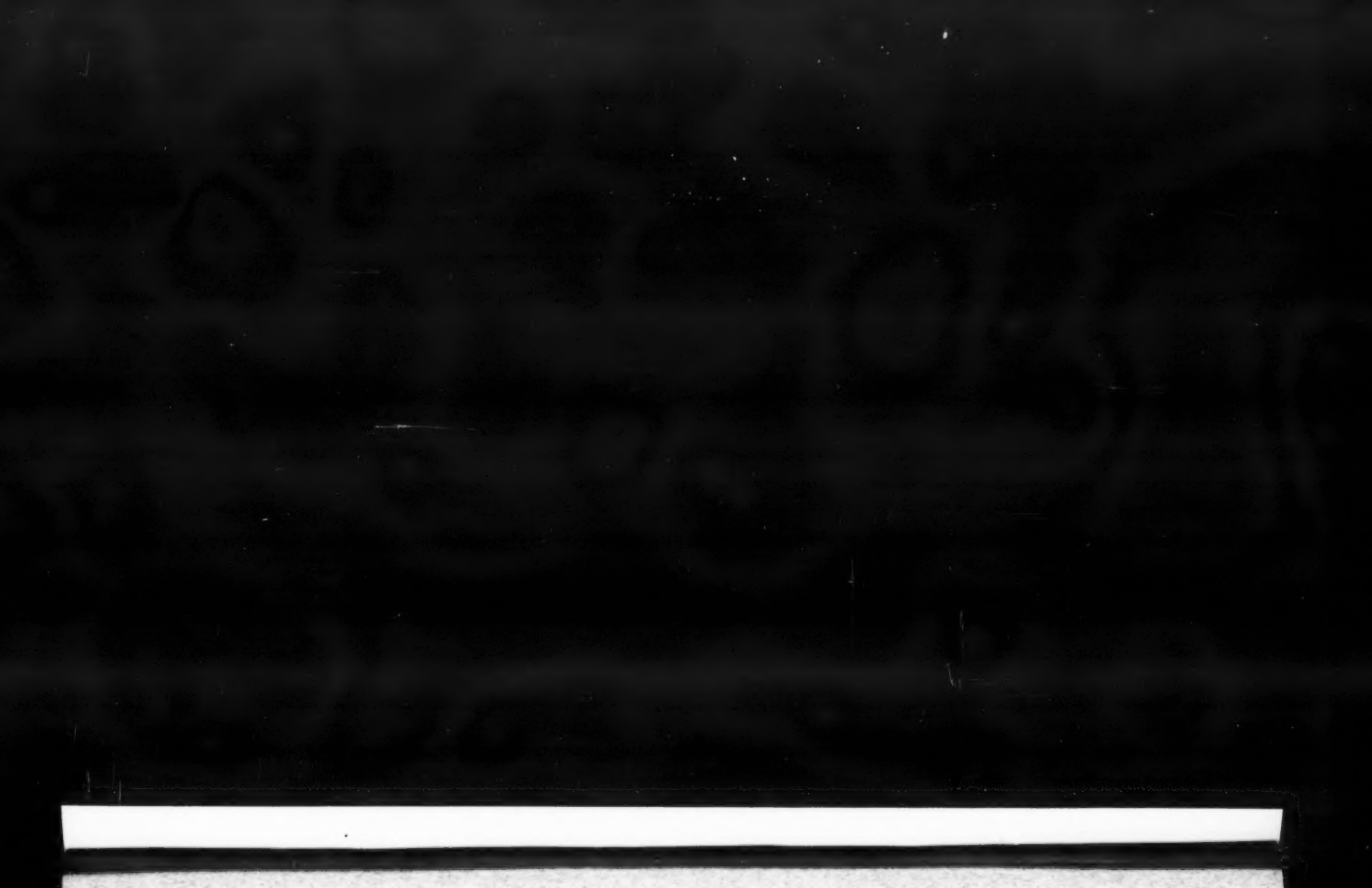
Write for prices and further information.

W. F. Straub Laboratories, Inc.

(Successors to Zell-Straub Laboratories)

5520 Norwood Park Ave. **CHICAGO, ILL.**

Biologics — Pharmaceuticals — Specialties



JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

H. Preston Hoskins, Secretary-Editor, 716 Book Building, Detroit, Mich.

T A. Sigler, President, Greencastle, Ind. M. Jacob, Treasurer, Knoxville, Tenn.

Executive Board

Geo. Hilton, 1st District; T. E. Munce, 2nd District; D. S. White, 3rd District; J. R. Mohler, 4th District; C. H. Stange, 5th District; Geo. H. Hart, 6th District; Cassius Way, Member at Large, Chairman.

Subcommittee on Journal

D. S. White J. R. Mohler

The American Veterinary Medical Association is not responsible for views or statements published in the Journal, outside of its own authorized actions.

Reprints should be ordered in advance. Prices will be sent upon application.

Vol. LXXI, N. S. Vol. 24 August, 1927 No. 5

IMPORTANT NOTICE

Members are hereby advised that there will be no general mailing of copies of the official program of the Philadelphia meeting. The detailed program of the meeting will be published in the September issue of the JOURNAL and copies of the program will be available for all those in attendance at the meeting as usual. Members who do not intend to be at Philadelphia may have copies of the program mailed to them by requesting the Secretary to do so. The principal reason for this new departure lies in the fact that it has been possible to send every member of the Association a copy of the program in previous years, at practically no expense for postage. With the change of the Association year, statements for dues are not mailed until after the annual meeting. Our older members will recall that it used to be the custom to enclose a copy of the program of the meeting with the statement for dues, sent out just before the annual meeting. Every member will have an opportunity to study the program by reading the September issue of the JOURNAL. Anyone desiring to receive a copy of the program, which will be merely a reprint of the material published in the JOURNAL, may secure same by requesting the Secretary to mail a copy. Kindly make such requests as early as possible.

HELP FINISH THE JOB

The members of the Committee on Schmidt Memorial are extremely anxious to complete the work of raising the fund necessary for a suitable memorial to the memory of Dr. Schmidt of milk-fever fame. It will be recalled that the Committee estimated the amount needed at approximately $1,000. Over one-half of this amount has already been raised, in the form of contributions from a number of the state associations. These are as follows:

Arkansas Veterinary Association	$ 10.00
California State Veterinary Medical Association	100.00
Connecticut Veterinary Medical Association	25.00
Illinois State Veterinary Medical Association	50.00
Indiana Veterinary Medical Association	20.25
Iowa Veterinary Association	50.00
Kansas Veterinary Medical Association	20.00
Kentucky Veterinary Medical Association	25.00
Massachusetts Veterinary Association	25.00
Michigan State Veterinary Medical Association	75.00
Minnesota State Veterinary Medical Association	50.00
Missouri Veterinary M3dical Association	25.00
Nevada State Veterinary Association	20.00
North Da,ota Veterinary Medical Association	10 00
Wisconsin Veterinary Medical Association	50 00

As practically none of the state or provincial associations that have not already contributed will hold meetings between now and the time of the Philadelphia meeting of the A. V. M. A., it has appeared desirable to place this matter before our members in general, so that veterinarians in any state, or province, where no contribution has been made by their association,s may make individual contributions. A number of veterinarians have already signified their willingness to contribute in this way.

The movement to erect some sort of a memorial to Dr. Schmidt in the name of the veterinarians of America was started almost two years ago and there is no reason why the completion of the project should be further delayed. The matter has been placed before practically every association in the country, either by letter or personally by some member of the Committee within the past year. Any veterinarians who would like to make personal contributions to the Schmidt Memorial Fund may do so by forwarding their checks, made payable to the A. V. M. A., to the Secretary-Editor.

Attend the meeting in Philadelphia
September 13-14-15-16,
Where many things began and the best continue

EXECUTIVE BOARD ELECTION

The election of a member of the Executive Board for District No. 1 (Canada) came to a close June 16, when the tellers canvassed the ballots which had been cast in the election. A careful tally of the ballots revealed the fact that Dr. George Hilton, of Ottawa, had been re-elected to represent Canada on the Executive Board of the American Veterinary Medical Association.

DR. GEORGE HILTON

Dr. Hilton has served continuously in this capacity since 1918, when he was elected to the same position for the first time, in the first election held under the present Constitution and By-laws. This is, therefore, the third time that Dr. Hilton has been elected a member of the Executive Board, a record that is unequaled.

Meet me where Penn met the Indians—
Philadelphia—September 13-14-15-16

EXAMINATION FOR JUNIOR VETERINARIAN

An examination for junior veterinarian in the Bureau of Animal Industry will be held some time during the week of September 26. Formal announcement of the examination will be published in the September issue of the JOURNAL.

PHILADELPHIA HOTELS

The hotels in the following list are arranged in the order of their proximity to the Bellevue-Stratford Hotel, which has been selected by the Local Committee on Arrangements as official headquarters for the Philadelphia convention. Information concerning the rates has been furnished by the Philadelphia Chamber of Commerce. The rates quoted are for the European plan. Some of the hotels listed offer an American-plan rate, which will be furnished on application.

Hotel	Location	Rooms	Single		Double	
			Without Bath	With Bath	Without Bath	With Bath
Bellevue-Stratford	Broad & Walnut	750	$4—$6	$5—$8	$6—$8	$7—$14
Ritz-Carlton	Broad & Walnut	161		$6—$8		$10—$15
Walton	Broad & Locust	350	$2.50–$3	$3.50–$5	$4—$5	$6—$8
St. James	13th & Walnut	350	$3	$3.50–$4	$4—$5	$5—$8
Sylvania	Juniper & Locust	400		$4 up		$6 up
Stenton	Broad & Spruce	50	$3.50	$5	$6	$8
Adelphia	13th & Chestnut	400		$4—$6		$6—$8
Maidstone	1327 Spruce St.	200		$3 up		$5—$6
Spruce	13th & Spruce	220	$2.50–$3	$3—$4	$4—$5	$5—$6
Vendig	13th & Filbert	216		$3—$4		$5—$8
Lafayette	1339 Arch St.	100	$2—$5	$3—$5	$3—$5	$5—$7
The Elks	Broad & Vine	210		$3–$3.50		$5—$7
Robert Morris	17th & Arch	208		$3—$4		$4.50–$7
Benjamin Franklin	9th & Chestnut	1200		$4—$7		$7—$10
Green's	8th & Chestnut	320	$2–$2.50	$3.50–$5	$3.50–$5	$5—$6

See Philadelphia—September 13-14-15-16.
Rich in History; active in Industry;
Renowned in Medical Science

PROFESSOR BANG AT PHILADELPHIA

Professor B. Bang, of Copenhagen, Denmark, has accepted the invitation of the American Veterinary Medical Association to attend the convention to be held in Philadelphia, next month, and to participate in the program. It is more than likely that Professot Bang will deliver two addresses at the meeting, one on infectious bovine abortion, and the other on either tuberculosis or paratuberculosis (Johne's disease). It is nineteen years since Professor Bang visited America and he is looking forward, with keen anticipation, to meeting again the members of the profession whose acquaintance he made here in 1908. Those whose privilege it will be to attend the Philadelphia meeting have a rich treat in store for them.

PRESIDENT SIGLER BUSY

Dr. T. A. Sigler, president of the A. V. M. A., addressed the Putnam County (Indiana) Shorthorn Breeders Association on "The Future of Agriculture," at the annual picnic of the organization at the Hanna Crossroads, near Greencastle, July 9. Dr. Sigler forecast a bright future for the breeder of good cattle, basing his prediction on the present trend of the live stock markets.

During the following week, President Sigler attended the meetings of the Missouri Valley Veterinary Association, at Omaha; the North Dakota Veterinary Medical Association, at Fargo; and the Minnesota State Veterinary Medical Association, at St. Paul. Upon his return from this trip through the Northwest, Dr. Sigler wrote that he had recovered from the effects of his recent accidents, although his fractured collar-bone was giving him a little trouble. If we may judge from a recent photograph of President Sigler, he is none the worse for his several accidents of the past year and if anything he is somewhat heavier than when we saw him early in the winter. Barring further accidents, he will be in the pink of condition for the strain of the convention in Philadelphia.

Thee and thine to the City of Penn;
Forget not when—September 13-14-15-16

A FEW FIGURES

A study of the reports of commencement exercises received from the various veterinary colleges in the United States and Canada reveals that the 1927 crop of veterinarians totals only 117. This is the smallest number of veterinarians to be graduated in any one year as far back as the records in this office show. Contrast the number 117 with the number 867, the total graduated during the year 1918, which was the peak year.

According to our figures for the ten-year period, beginning with the year 1909 and ending with 1918, both years inclusive, the average number of veterinarians graduated each year was approximately 726. For the nine years following, beginning with the year 1919 and ending with the present year, the average number of veterinarians graduated each year dropped to 204. These figures speak for themselves. The number of veterinary students remaining in the colleges after this year's commence-

ment exercises was less than 500. These men will constitute the sophomore, junior and senior classes for the next college year.

It does not take much of a mathematician to figure that the number of veterinarians to be graduated during the years 1928, 1929 and 1930 can not possibly be much over 150, after making due allowance for an average number of losses from the present number of students, for various causes. Even if every man who was a junior the past year finishes his course and is graduated next year, the average number of graduates for the present ten-year period will be pulled down below the 200 mark or to approximately one-fourth of the number of graduates for the ten-year period preceding the present one.

Attend the meeting in Philadelphia,
September 13-14-15-16,
Where many things began and the best continue

PHILADELPHIA GARAGES

For the benefit of those who intend to drive their cars to Philadelphia, the Local Committee on Arrangements has supplied the names and addresses of the following garages, all located comparatively near the Bellevue-Stratford Hotel, the official headquarters:

New Central	314 South Camac Street
Pennsylvania	329 South Broad Street
U. S. M. C.	1427 Manning Street
U. S. M. C.	1407 Locust Street
Brown Service	1411 Locust Street.

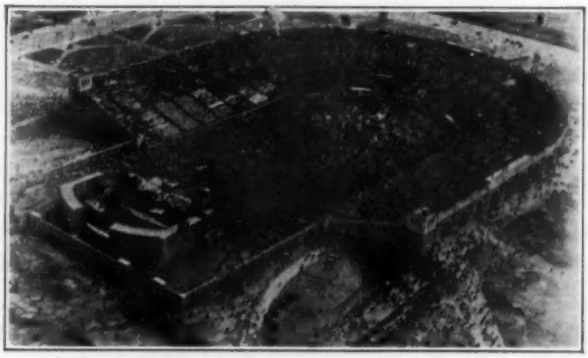
See Philadelphia—September 13-14-15-16.
Rich in History; active in Industry;
Renowned in Medical Science

ANNUAL REGISTRATION IN CALIFORNIA

Dr. J. L. Tyler, of Pomona, Calif., has forwarded a copy of California's new Veterinary Practice Act. One of the features of the new law is to require the annual renewal of license to practice in California. The fee in connection with this renewal is $2.00 annually. Dr. Tyler is president of the California State Board of Examiners of Veterinary Medicine and veterinarians who are registered in California and desire to renew their licenses under the new law should get in touch with Dr. Tyler immediately.

A FLOOD OF APPLICATIONS

This month we are listing forty-two applications for membership for the first time and we are also giving the second listing to fifty applicants whose applications were presented for the first time last month. This total of ninety-two applications in two months breaks all records for any similar period since the present system of handling applications for membership has been in effect and it speaks well for the resident secretaries in those states where the largest numbers of applications have been secured. Pennsylvania is leading with forty applications received since the meeting in Lexington, last summer, largely due to the efforts of Dr. G. A. Dick, our resident secretary for the Keystone State, ably assisted by Dr. E. T. Booth, secretary of the Veterinary Alumni Association of the University of Pennsylvania. These men have been capitalizing on the meeting to be held in Philadelphia for the purpose of arousing interest among new members, both from the state of Pennsylvania as well as from the ranks of University of Pennsylvania alumni. There is nothing like the proximity of a meeting of the A. V. M. A. to arouse interest in the organization. Indiana at the present time is in second place, with twenty-six applications. Dr. F. J. Muecke, our enthusiastic resident secretary for the Hoosier State, has been working with President Sigler and the results speak for themselves. Minnesota is in third place, with twenty-one, thanks to the efforts put forth by Dr. H. C. H. Kernkamp, A. V. M. A. resident secretary for the Gopher State. Evidently the Minnesota veterinarians want the 1928 meeting to be held in Minneapolis.



Municipal Stadium, Philadelphia.

APPLICATIONS FOR MEMBERSHIP

See April, 1927, JOURNAL

FIRST LISTING

ALEXANDER, J. M. Cannon Falls, Minn.
D. V. M., McKillip Veterinary College, 1913
Vouchers: K. J. McKenzie and H. C. H. Kernkamp.

BAKER, DONALD DALE Wabash, Ind.
D. V. M., Iowa State College, 1923
Vouchers: R. C. Julien and F. H. Brown.

BARTHELME, LEE FRANCIS 1815 Washington Ave., Parsons, Kans.
V. S., B. V. Sc., Ontario Veterinary College, 1927
Vouchers: L. T. Richard and C. D. McGilvray.

BISHOP, WM. JENNINGS City Hall, Bartlesville, Okla.
D. V. M., Iowa State College, 1926
Vouchers: C. H. McElroy and C. R. Walter.

CARL, CHARLES HOWARD Clinton, Minn.
D. V. M., Indiana Veterinary College, 1921
Vouchers: R. Fenstermacher and Harry Evenson.

CARLSON, J. O. Granite Falls, Minn.
D. V. S., Grand Rapids Veterinary College, 1918
Vouchers: C. A. Nelson and Harry Evenson.

DICKINSON, ERNEST MILTON Boston, Ohio.
D. V. M., Ohio State University, 1927
Vouchers: Russell E. Rebrassier and Leonard W. Goss.

FALLS, FRANCIS 39th St. Woodland Ave., Philadelphia, Pa.
V. M. D., University of Pennsylvania, 1906
Vouchers: E. T. Booth and Benj. Rau.

ELTHON, H. O. Nerstrand, Minn.
D. V. M., Terre Haute Veterinary College, 1918.
Vouchers: K. J. McKenzie and M. R. Higbee.

FINDLAY, JAMES J. 2045 Dunedin Ave., Duluth, Minn.
V. S., Ontario Veterinary College, 1888
Vouchers: H. C. H. Kernkamp and C. A. Nelson.

FRITZ, BENJAMIN SCOTT Strasburg, Pa.
V. M. D., University of Pennsylvania, 1917
Vouchers: H. R. Church and T. E. Munce.

GRAVES, EARL FRANCIS 1030 Fremont St., Manhattan, Kans.
B. S., Kansas State Agricultural College, 1922
D. V. M., Kansas State Agricultural College, 1927
Vouchers: H. F. Leinhardt and Joseph P. Scott.

HANSEN, HANS PETER Austin, Minn.
D. V. M., Chicago Veterinary College, 1913
Vouchers: R. Schaap and H. C. H. Kernkamp.

HERROLD, CHARLES H. 909 So. 10th St., Lafayette, Ind.
V. S., Ohio State University, 1904
M. D. V., McKillip Veterinary College, 1905
Vouchers: Edgar D. Wright and Ray B. Whitesell.

JOHNSON, E. P. Mich. State College, East Lansing, Mich
M. S., D. V. M., Michigan State College, 1925
Vouchers: H. J. Stafseth and Ward Giltner.

KIEBEL, ROLAND W. Monticello, Minn.
M. D. C., Chicago Veterinary College, 1910
Vouchers: C. A. Nelson and H. C. H. Kernkamp.

KNORTH, C. A. 117 Bush St., Red Wing, Minn.
D. V. M., Chicago Veterinary College, 1913
Vouchers: K. J. McKenzie and H. C. H. Kernkamp.

McCabe, John F. Williamsburg, Iowa.
D. V. M., St. Joseph Veterinary College, 1920
Vouchers: Grant B. Munger and J. C. Glenn.

McInnes, John 26 Fell St., San Francisco, Calif.
D. V. M., San Francisco Veterinary College, 1916
Vouchers: Joseph M. Arburua and O. A. Longley.

McLaughlin, Charles Harrison R. D. No. 2, Chambersburg, Pa.
V. M. D., University of Pennsylvania, 1918
Vouchers: E. T. Booth and Joseph G. Moon.

Mack, Charles Arthur Forest Lake, Minn.
V. S., Ontario Veterinary College, 1901
D. V. M., McKillip Veterinary College, 1902
Vouchers: C. A. Nelson and Chas. E. Cotton.

Melgaard, H. T. Elk River, Minn.
D. V. M., Ohio State University, 1924
Vouchers: C. A. Nelson and A. L. Lee.

Moe, Lewis H. Watford City, N. D.
D. V. M., Ohio State University, 1927
Vouchers: A. F. Schalk and Leonard W. Goss.

Moore, Burke E. New Bern, N. C.
D. V. M., U. S. College of Veterinary Surgeons, 1920
Vouchers: Wm. Moore and L. J. Faulhaber.

Mortimer, Alexander A. Randolph, Vt.
V. M. D., University of Pennsylvania, 1921
Vouchers: L. H. Adams and L. A. Klein.

Ober, Fred L. R. 1, Duluth, Minn.
D. V. M., Chicago Veterinary College, 1917
Vouchers: H. C. H. Kernkamp and C. P. Fitch.

Osborn, Floyd C. Le Sueur, Minn.
D. V. M., McKillip Veterinary College, 1913
Vouchers: K. J. McKenzie and H. C. H. Kernkamp.

Parks, Wellington Edward 5 Fairview Ave., Chatham, N. Y.
D. V. M., Cornell University, 1919
Vouchers: F. D. Holford and Mulford C. Thompson.

Patchen, Ernest Hoyt 83 New Haven Ave., Milford, Conn.
D. V. M., Ohio State University, 1923
Vouchers: Geo. E. Corwin and O. V. Brumley.

Radford, Philip H. Slayton, Minn.
D. V. M., Kansas City Veterinary College, 1918
Vouchers: H. C. H. Kernkamp and C. P. Fitch.

Ricker, Harry Glenn Millheim, Pa.
V. M. D., University of Pennsylvania, 1920
Vouchers: E. P. Althouse and Chas. P. Bishop.

Russell, Alden Hesseltine 3 River St., Concord, Mass.
D. V. M., Cornell University, 1920
Vouchers: H. W. Jakeman and E. A. Cahill.

Shannon, Dennis Stephen 10 Southwick Rd., Westfield, Mass.
V. M. D., University of Pennsylvania, 1914
Vouchers: H. W. Jakeman and E. T. Booth.

Shannon, Ladwin D. 3918 4th Ave., Sioux City, Iowa.
D. V. M., Iowa State College, 1927
Vouchers: J. R. Roche and W. F. Guard.

Speer, Fred Dept. of Bact., Ohio State Univ., Columbus, Ohio.
D. V. M., Ohio State University, 1919
Vouchers: David S. White and Jas. D. Grossman.

Stein, Howard L. 44 No. 4th St., Emaus, Pa.
V. S., Ontario Veterinary College, 1893
Vouchers: Sherman Ames and J. O. Reed.

STEINBACH, HARRY B. 710 W. Marshall St., Norristown, Pa.
V. M. D., University of Pennsylvania, 1927
Vouchers: Louis A. Klein and G. A. Dick.

WANNER, EDWARD Willmar, Minn.
D. V. M., McKillip Veterinary College, 1911
Vouchers: B. A. Utter and H. C. H. Kernkamp.

WHITE, S. R. Box 881, Princeton, W. Va.
D. V. M., Ohio State University, 1922
Vouchers: F. E. Johnson and H. M. Newton.

WILLIAMS, ROY C. New Richland, Minn.
M. D. V., McKillip Veterinary College, 1910
Vouchers: H. C. H. Kernkamp and C. P. Fitch.

WOODWARD, BENJAMIN T.
U. S. FOOD, Drug & Insecticide Adm., Washington, D. C.
V. M. D., University of Pennsylvania, 1902
Vouchers: E. T. Booth and J. R. Mohler.

ZILLIGEN, JOSEPH J. 1602 S. Union Ave., Los Angeles, Calif.
V. M. D., University of Pennsylvania, 1906
Vouchers: W. L. Curtis and John L. Tyler.

Applications Pending

SECOND LISTING

Addis, Clarkson, Collegeville, Pa.
Arpke, Raymond H., Box 527, Sheboygan, Wis.
Bailey, John Groff, 711 E. Broadway, Milton, Pa.
Black, William L., Sonora, Texas.
Brockett, Fred John, Suffield, Conn.
Brown, Albert Lyle, 104 Second St., Deposit, N. Y.
Bryant, Maynard L., 43 Summer St., Montpelier, Vt.
Chandler, Fred H., 70 W. Main St., Miners Mills, Pa.
Classick, Harold J., Hurley, S. D.
Davisson, Lee, R. F. D. No. 2, Manchester, Mich.
Dayton, Roland C., 4709 Lancaster Ave., Philadelphia, Pa.
Demsey, H. W., Huntington, Ind.
DeVita, Joseph, 621 Chapel St., New Haven, Conn.
Douglass, Oliver T., 2728 Boone St., Ames, Iowa.
Elliott, Thomas A., Genesee, Idaho.
Fuller, Willis Doty, Drawer 575, Somerset, Pa.
Galbraith, Albert C., Newville, Pa.
Grauch, Charles J., 38 Arbutus Ave., Pitman, N. J.
Griffith, John James, 109 Boylston St., Bradford, Pa.
Harbaugh, Fred George, 1219 Forest Ave., Wilmette, Ill.
Hartman, Guldin R., 914 N. 15th St., Philadelphia, Pa.
Hawn, M. C., Box 111, Tecumseh, Nebr.
Hench, Charles Martin, 127 S. Cumberland St., Waynesburg, Pa.
Johansen, E. William, Vet. Clinic, Ohio State Univ., Columbus, Ohio.
Jones, Frank Edward, 91 Plum St., Greenville, Pa.
Kohler, Daniel R., Boyertown, Pa.
Lawrence, Charles Curtis, Griswold, Iowa.
Leighow, George M., Bloom Rd., Danville, Pa.
McCarthy, Philip James, 30 W. Gravers Lane, Chestnut Hill, Phila., Pa.
McElwee, Ellsworth, New Albany, Ohio.
McKibbin, Robert Webber, 216 W. Second St., Waynesboro, Pa.
Martin, A. S., Box 309, Moscow, Idaho.
Massinger, Charles Eber, 805 Main St., Phoenixville, Pa.
Massinger, Eber Michener, 805 S. Main St., Phoenixville, Pa.
Moore, Stevenson, Jr., 57 Austin St., Chicopee, Mass.
Pas, Harold H., Orange City, Iowa.
Peterson, Lynn Allen, Lewiston, Pa.

Powell, Arthur James, Lewiston, Idaho.
Rile, Frederick C., Owingsville, Ky.
Skinner, Charles Bailey, 86 E. Main St., Cobleskill, N. Y.
Smith, G. O., Ligonier, Ind.
Smith, George T., 224 Water St., Hughesville, Pa.
Vansant, Allen Stearne, Fox Chase, Philadelphia, Pa.
Wallace, W. B., 220 W. 2nd St., Marion, Ind.
Webb, J. Alexander, Avondale, Pa.
Wehr, Grant A., Denver, Pa.
Welsh, William Edward, c/o Board of Health, Hibbing, Minn.
Whipple, Roy O., 226 S. 3rd St., Lemoyne, Pa.
White, Walter G., 116 W. Baltimore Ave., Lansdowne, Pa.
Wiles, Shelton, 428 E. Washington Blvd., Fort Wayne, Ind.

The amount that shall accompany an application filed this month is $7.08 which covers membership fee and dues to January 1, 1928, including subscription to the JOURNAL.

Meet me where the Continental Congress met;
Sign where the Declaration of Independence was signed—
In Philadelphia. September 13-14-15-16

COMING VETERINARY MEETINGS

San Diego-Imperial Veterinary Medical Association. San Diego, Calif. Aug. 3, 1927. Dr. W. G. Oliver, Secretary, 3821 Arizona St., San Diego, Calif.

Chicago Veterinary Society. Great Northern Hotel, Chicago, Ill. Aug. 9, 1927. Dr. J. B. Jaffray, Secretary, 2956 Washington Blvd., Chicago, Ill.

Hudson Valley Veterinary Medical Society. Kenozia Lake Club, Ashokan Dam, N. Y. August 10, 1927. Dr. Wm. Henry Kelly, Secretary, 233 Western Ave., Albany, N. Y.

Kansas City Association of Veterinarians. New Baltimore Hotel, Kansas City, Mo. Aug. 16, 1927. Dr. J. D. Ray, Secretary, 400 New Centre Bldg., Kansas City, Mo.

Ontario Veterinary Association. Ontario Veterinary College, Guelph, Ont. Aug. 16-17, 1927. Dr. H. M. Le Gard, Secretary, 223 Main St. N., Weston, Ont.

Keystone Veterinary Medical Association. Philadelphia, Pa. Aug. 24, 1927. Dr. C. S. Rockwell, Secretary, 5128 Chestnut St., Philadelphia, Pa.

American Veterinary Medical Association. Bellevue-Stratford Hotel, Philadelphia, Pa. Sept. 13-14-15-16, 1927. Dr. H. Preston Hoskins, Secretary, 716 Book Bldg., Detroit, Mich.

Indiana-Illinois Veterinary Medical Association. Washington, Ind. Sept. 16, 1927. Dr. Frank M. Tade, Secretary, 528 N. 1st St., Vincennes, Ind.

OSTERTAGIA OSTERTAGI IN CALIFORNIA CATTLE, WITH COPPER SULPHATE AN APPARENTLY SUCCESSFUL THERAPEUTIC*

By E. H. BARGER

University of California, Davis, California

In January, 1927, our attention was called to deaths occurring in a herd of beef cattle in the upper San Joaquin Valley, which upon later investigation proved to be due to infestation with the parasite *Ostertagia ostertagi*. The owner of the herd reported that a few deaths had occurred and that other animals were not doing well. Inquiry revealed the presence of symptoms of some debilitating condition, characterized by unthriftiness, progressive emaciation, rough coat and diarrhea, with death the usual outcome in affected animals. For some time reports have been received, from other sections of the State, of cattle dying, showing symptoms of a similar character, but no investigations have been made prior to the one herein reported.

HISTORY OF OUTBREAK

The cattle population of the place consists of approximately 150 pure-bred Hereford cows, 90 yearling calves and four pure-bred Hereford bulls. In the fall of 1926, one of the cows (which had been on pasture separate from that of the calves) was noticed to be thin and scouring. The animal was not seen again for some time and was subsequently found dead in the pasture. About January 1, 1927, five or six steers appeared unthrifty, with rough coats, and showing varying degrees of diarrhea. With the abundant pasture growth available, the condition obviously was not due to lack of good food. The owner, even at this time, believed the trouble to be due to some alteration in the pasture growth, caused possibly by the excessively heavy winter rains. Rolled barley and alfalfa hay were fed to the animals in an effort to improve their condition but with no apparent results. By this time it was evident that the condition was progressing through the herd of calves, as observation showed four additional cases. It was at this stage of the trouble that the owner sought aid in an endeavor to determine the nature of the trouble.

*Read at the annual meeting of the California State Veterinary Medical Association, Sacramento, June 13-14-15, 1927.

In attempting to trace the source of the infestation, one incident had occurred which might have a possible relation to the outbreak. During the summer a neighbor stockman brought in several animals from another section of the State, where some of the cattle had for some time been affected with an undiagnosed, unthrifty condition. These animals were pastured in the field in which the mature cows are now kept, being removed early in the fall. Five of the animals brought in died, showing gradual emaciation accompanied by diarrhea of varying severity. The fields in this area are very level and during the heavy winter rains the water stands over the area, making a direct contact from one field to the other. Although no investigation was made concerning the nature of the trouble affecting the animals imported into this region, it is possible that they were affected at the time of introduction and the water served as a means of transporting the parasites and their ova from one field to the other. In this connection it is interesting to note that one mature cow, pastured in the adjoining field, previously occupied by the imported cattle, died of an undiagnosed diarrheic disease, but since that time there has been no indication of disease among the remaining mature cattle on the field.

During the summer the fields became very dry and despite the fact that clean well-water is before them at all times, the animals drink from a small pond in one end of the field. It is possible that ova were washed into the field during the rainy weather and thus the pond later served as the means of infesting the calves. The fact that the premises have been used as pasture land for years with no recorded trouble leads to the conclusion that the introduction of the parasites was comparatively recent.

Appearance of Affected Animals

Observation of the calves revealed an obviously unthrifty condition of several animals. They lagged behind the group and some of the more severely affected animals showed a slight staggering gait. There was emaciation and the hair-coat was rough and erect. The severely affected animals were smeared with fecal matter about the hind parts, and when the group moved, several of them showed a very loose condition of the bowels, the feces being voided in a stream.

The tails were carried as close to the body as possible and the abdomen was "tucked up." None of them, however, except the one from which the first specimens were taken, showed any

edema of the submaxillary region or dewlap, as might be expected, and which has been noticed in other outbreaks.

The feces were very fluid, gaseous and stinking, and contained a large amount of undigested food. No effort was made to determine pulse, respiration or temperature, because the animals were so wild that roping would have been necessary.

Postmortem Lesions

At the time the trouble was first reported and at our suggestion, the viscera of an affected animal were brought to the laboratory for examination. The lungs, heart, liver, spleen, pancreas, stomachs and intestines constituted the material submitted, which was in excellent condition upon arrival. The gross pathological picture was that of a wasting disease of some

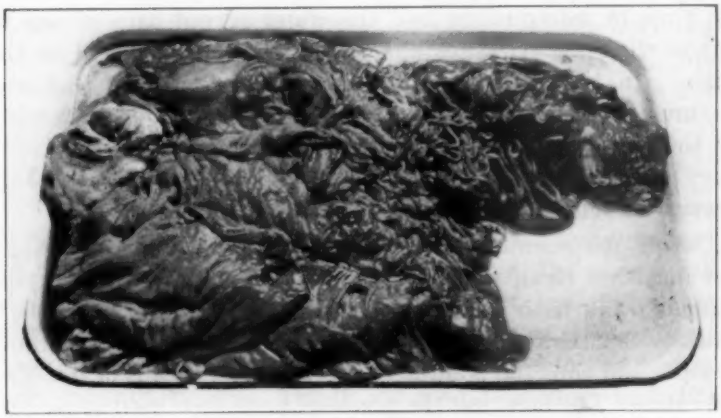


Fig. 1. Mucosa of abomasum of bovine infested with *Ostertagia ostertagi*.

sort, but since the most pronounced lesions appeared in the abomasum and intestines, these received first consideration. Th intestines, both large and small, particularly the latter, presented changes in the mucosa suggestive but not pathognomonic of paratuberculosis. Systematic staining of material from different portions of the tract failed, however, to reveal any acid-fast microörganisms. Failing to find any diagnostic lesions in the intestines, the abomasum was next studied and careful search showed large numbers of a very small hair-like worm, which upon later examination were identified as *Ostertagia ostertagi*. A visit was subsequently made to the ranch in order to observe the affected animals first-hand, and one of the worst animals was shot and autopsied. The calf was thin, hair rough and erect, skin tight,

and the hind quarters smeared with feces. The owner estimated this particular animal to be at least two hundred pounds under normal weight. The eyes were sunken and there was a pallor of the visible mucous membranes. Upon severing the vessels of the throat there was a noticeable diminution in the force, quantity and quality of the blood, which was of a very watery consistency. There were no gross lesions, but a marked absence of omental and other fat was noted upon opening up the abdominal and thoracic cavities. The amount of ingesta in the stomachs and intestines was far below what would be expected. Aside from a noticeable paleness, the mucosa of the rumen, reticulum and omasum presented no apparent changes. The abomasum, however, was the seat of marked changes and the following are the notes recorded of its appearance:

> Abomasum appears to be noticeably enlarged in capacity with a distinct thickening of the walls of the entire organ. There is very little fat in the tissue surrounding it. The folds of the lining mucosa are raised to several times their normal height and are enormously thickened with an edematous infiltration. The largest folds are at the omasal end, gradually becoming smaller toward the pyloric opening. The tallest folds (from base upward) are approximately three and one-half inches in height, gradually diminishing to a height of one-half inch at the pyloric opening.
>
> The membrane has a pinkish-grey color and upon close examination there are visible countless whitish, discreet areas about the size of a pinhead or smaller, with a very few advanced so they are definitely pustular. The whole mucosa is very watery and a considerable amount of clear, straw-colored fluid exuded from the folds within a short time after the organ was placed on a flat surface. A lymphnode near the omasal end is markedly enlarged, being about the size of a hen's egg. When cut open, it has a greyish-green color at the periphery, and a greyish tinge in the middle, with the consistency of soft rubber. The mucosal folds are easily torn and a clear, straw-colored fluid exudes in considerable amounts from any opening made. There is a comparatively small quantity of food material in the organ, the ingesta being of a greenish color, watery and having much mucus admixed. A layer of ingesta adheres firmly to the mucous membrane and comes away only after some scraping. Close examination of the stomach contents shows countless fine hair-like worms, many of them with varying lengths of their bodies buried in the mucosa.*

Description of Parasite

The following description, including the life history, of the parasites is taken from Ackert and Muldoon:[1]

> These parasites are slender, hair-like nematodes, yellowish white in color. They range from about one-fourth to one-third of an inch in length, and occur in the abomasum, where they may be free or in the mucous membrane. As these nematodes are easily confused with other strongyles inhabiting the stomach and intestine of cattle, a rather full description of them is given.
>
> The males vary from 6.4 to 7.2 mm. in length. Their greatest thickness is just in front of the bursa, being 106 to 119 microns. The head ranges from 14 to 21 microns in diameter. At the level of the nerve ring

*The parasites were definitely identified as *Ostertagia ostertagi* by Dr. S. B. Freeborn, of the Division of Entomology and Parasitology.

the diameter of the body is 47 microns and at the base of the esophagus it is 70 microns. The esophagus is 672 microns long and at the base of the esophagus it is 70 microns. The esophagus is 672 microns long and is encircled by a nerve ring 252 to 276 microns posterior to the mouth opening. At a distance of 311 to 315 microns from the anterior end is the excretory pore which is 13 microns in front of the cervical papillae. Beginning with a diameter of 15 to 17 microns, the esophagus gradually widens to from 42 to 50 microns at its posterior end. The rather small bursa with lobes outspread is about twice as wide as the greatest diameter of the body. The latter terminates abruptly between the wings of the bursa. In the walls of the bursa are a single dorsal ray and six pairs of rays. The paired ones are of nearly equal diameter, except the lateroventral one, which is somewhat thicker than the others. In each lobe the tips of the ventral and lateroventral rays lie close together, as do also those of the mediolateral and posterolateral rays. The dorsal ray, approximately 56 microns long, divides in its distal half into two divergent branches which bifurcate just before they end. The length of the forked spicules is 213 microns, while that of the gubernaculum is 45 microns.

The females are approximately 8.5 mm. long by 136 microns wide at the vulva. Diameters of different regions of the body are as follows: Head, 22 microns; at nerve ring, 56 microns; at base of esophagus, 70 microns; and at anus, 41 microns. As in the male, the esophagus widens as it extends posteriorly, and is surrounded by a nerve ring at a point 262 microns from the oral opening. A prominent cuticular flap covers the transverse, slit-like vulva, which is slightly over 1 mm. from the posterior end of the body. The tail gradually tapers to a rounded tip which is 106 microns posterior to the anus. The muscular parts of the ovijectors form a cask-shaped structure 213 microns long by 73 microns in diameter at its maximum thickness. The oval, thin-shelled eggs measure from 60 to 73 by 42 microns in diameter.

The size and structure of these nematodes make it evident that they are *Ostertagia ostertagi* (Stiles, 1892) Ransom, 1907, formerly known as *Strongylus ostertagi* Stiles, and as *Strongylus convolutus* Ostertag.

Life History of Parasite

The present writers made no attempt to incubate the eggs of *Ostertagia ostertagi* or to work out its life history, although segmentation had proceeded to the 4-cell stage in the uteri of the females under observation, and ejected eggs free in the normal saline solution had reached the 16-cell stage in 24 hours after their removal from the steer. Concerning this species, Stodter (1901, p. 52) states that in the uteri the eggs are usually in the 2 to 8-cell stage and only rarely are they sufficiently developed to show the outline of the embryo. According to this author, the eggs after passing out with the feces develop rapidly in warm weather, forming complete, motile embryos in 12 to 24 hours. During the second day the embryos hatch and are very active in the surrounding medium.

The free embryos range from 0.2 to 0.3 mm. in length, the anterior end being rounded and the posterior end pointed. Entering upon the larval stage, the young nematodes attain a length of 1.5 mm. In Stadelmann's opinion (1891, p. 37) the larvae in this stage are taken in with the food, soon reaching the fourth stomach of the host. The parasite now bores into the mucous membrane, probably with the aid of two well-developed larval teeth, and assumes a spiral position close to the muscularis mucosa. An exudate with round-cell infiltration then appears, and the nodule formation begins. The developing nematode molts, passing into the second larval period. The reproductive organs begin forming and the digestive tract soon becomes plainly recognizable. The size of the larva is materially increased, as is also that of the surrounding nodule. After a second molt in the nodule, the young parasites become sexually mature worms, but he never succeeded in finding ejected eggs or free embryos in them. Sooner or later the mature males and females

pass into the lumen of the abomasum, abandoning the nodules, which begin to degenerate and to show the characteristic erosions.

The fecundity of these nematodes apparently is not marked, as there were but 9 to 11 ripe eggs in the uteri of the females studied by the writers. This is in accord with the observations of Stadelmann, who remarks that from the number of eggs produced in this species the fecundity in comparison to that of other nematodes is not great.

The length of life cycle probably depends upon the climate. At the latitude of Berlin, the observations of Stadelmann indicate that a life cycle of this parasite was completed in approximately four months. However, with the embryo hatching in two days under favorable conditions, it is probably that in warmer climates the length of life cycles does not require more than half of that time.

Previous Outbreaks of Strongylosis Caused by Ostertagia Ostertagi

After being first discovered in cattle in Germany by Ostertag, in 1889, this parasite has been reported from several countries, including Argentina, England and New Zealand. So far as we have been able to determine, only two previous outbreaks of strongylosis due to *Ostertagia ostertagi* have been reported in the United States: by Stiles,[2] in Texas, in 1889, and by Ackert and Muldoon, in Kansas, in 1920. The latter authors state: "The ease of overlooking it is probably responsible for the few records of its occurrence in gastro-intestinal outbreaks."

Animals Affected

Stiles[2] records the infestation of cattle and sheep by this parasite and also says:

> No post-mortem examinations of goats were made but from microscopic fecal examinations which were made, from the general symptoms noticed, from the fact that sheep and goats were running together, and finally from the results of experiments in treatment, I have little doubt that the goats were suffering from the same parasites that were found in the sheep.

Treatment

Stiles, also Ackert and Muldoon report treatment as unsatisfactory. The former investigator does not give details of any specific treatment but says: "I regret to state that all my experiments to kill this worm must be looked upon as failures." Ackert and Muldoon tried a number of combinations but state that they were apparently without result.

The symptoms produced by the nematode, together with its nature and location, suggested a close relationship with the stomach-worm disease of sheep produced by *Haemonchus contortus*. It was accordingly decided, with the consent of the owner, to determine the efficacy of copper sulphate as a treatment.

The calves were corralled, a chute built, and twenty-eight definitely affected calves were each given 750 cc of a 1 per cent aqueous solution of copper sulphate in a drench. This proved a difficult task since the animals were not accustomed to being handled, and it required much time and patience. Some of the animals were so refractory that no idea could be gained as to how much of the solution actually reached the digestive tract. As expected, several of the animals left the chute coughing violently and, within the next three days, four had died of mechanical pneumonia. The survivors presented a bedraggled appearance for about a week, after which time they appeared to improve slightly. This method of medication was tried first to determine if a single large dose of the solution would have any marked value. The impracticability of the method was evident, if necessary to be used on a large scale, but since it was believed that a slight beneficial effect was noted, we endeavored to find a practical way of administering the copper sulphate.

The method of preparation was as follows:

Two pounds of copper sulphate were dissolved in one gallon of hot water. The solution was sprinkled on barley on a concrete floor with continuous mixing to insure as uniform distribution as possible over the grain. This amount of solution served to dampen two sacks of barley. The grain was then spread out in a thin layer, allowed to dry, and was then found to be coated with a fairly uniform film of copper sulphate.

This amount of medicated feed served for one feed for the fifty less severely affected calves, and the animals were given the grain once weekly until five feeds had been given. At first the treated grain was refused, but after spreading a layer of clean barley over that which had been "sulphated," the calves ate it readily. The smaller group of animals was fed sulphated barley weekly, in the same proportions as the larger group, until seven feeds had been given.

There appeared to be a gradual improvement in the entire group, the change being most marked in the less severely infested animals. The herd was seen again about two months after inauguration of the treatment and there was a remarkable improvement in the group as a whole. The owner was enthusiastic over the results and states that he believes most of the animals are gaining weight and condition satisfactorily. The treatment was discontinued for about one month but is being

administered twice monthly at present. Recent communications from the owner state that the most severely affected animals have improved in condition sufficiently to be ready for the market, where they are being sent. The remaining fifty head are reported to be in excellent condition.

SUMMARY

1. An outbreak of strongylosis due to *Ostertagia ostertagi* occurred in the San Joaquin Valley in California during the winter of 1926-1927.

2. About 35 head of yearling calves were visibly affected.

3. The disease made fairly rapid progress in the herd after first being observed.

4. There has been a total loss of eleven head from all causes, including drenching and those destroyed for autopsy.

5. The important symptoms in this outbreak have been: emaciation, anemia, weakness, rough coat and diarrhea of varying severity. In only one animal has there been observed edema of the submaxillary region.

6. Copper-sulphated grain appears to have some beneficial effect in controlling the condition.

REFERENCES

[1]Ackert, J. E. and Muldoon, W. E.: Strongylosis (ostertagia) in cattle. Jour. A. V. M. A., lviii (1920), n. s. 11 (2), pp. 138-146.

[2]Stiles, C. W.: Verminous diseases in cattle, sheep and goats in Texas. U. S. Dept. Agr., B. A. I., 17th Ann. Rpt. (1900), p. 356.

Meet thy friends in the Friendly City—
Philadelphia, September 13-14-15-16

CAMPSITES FOR MOTORISTS

The following information relative to campsites is furnished for the benefit of any members who are planning to drive to Philadelphia and camp there during the week of the convention:

For those entering Philadelphia via Lincoln Highway from the north and east: Camp Roosevelt, Roosevelt Boulevard and Byberry Road. Water, light, sanitation.

For those coming from the west via Lincoln Highway: Camp Lincoln, Haverford Avenue and City Line. Water, light, sanitation. Fee $1.00.

For those coming from the south via Chester Pike: Camp Darby, Moose Athletic Field, two blocks north of Main St., Darby. Water, light, sanitation. Fee 50 cents.

Trolley cars or motor busses run from these camps into the City.

MEAT AND MILK HYGIENE

By Louis A. Klein et al*

Philadelphia, Pa.

Meat Hygiene

During 1925 there was a notable advance in meat hygiene and slaughter-house sanitation conducted by the Pennsylvania Bureau of Animal Industry. There were 476 establishments found grossly defective in sanitary requirements. In 153 places the defects were remedied by thorough renovating, remodeling, or desired changes in equipment and methods. Eighty-two of the most undesirable establishments were replaced by entirely new buildings.

One hundred fifty-three slaughter-houses were officially closed against further uses for any branch of the meat business. In a few cases the owners of the closed establishments persisted in operating after receiving official notice to close. They were arrested and fined, as were also several dealers convicted of selling diseased meats.

Seventy-one retail meat markets were also found defective, and 34 of them were officially closed after the owners failed to remedy the defective conditions. In many other slaughter-houses, meat-markets, storage-rooms and vehicles defects were found consisting mainly of uncleanly conditions. Defect notices were not served on these places when the owners started an immediate clean-up.

About 15,500,000 pounds of meat were examined by agents of the Pennsylvania Bureau of Animal Industry, of which amount 380,556 pounds were condemned on account of disease or other unwholesome condition.

The annual consumption of meat in Pennsylvania is placed at 1,500,000,000 pounds. Of this amount it is estimated that more than 400,000,000 pounds are slaughtered, prepared, handled and sold without any official supervision.

There are in Pennsylvania approximately 4,000 slaughtering places and 20,000 other meat establishments handling about 500,000,000 pounds of meat annually, which does not come

*Report of the Committee on Hygiene of the Pennsylvania State Veterinary Medical Association, presented at the annual meeting in Philadelphia, September 15, 1926. The first section, on Meat Hygiene was prepared by Dr. W. S. Gimper and the second, on Milk Hygiene, by Drs. George W. Grim and H. B. Mitchell. Dr. Louis A. Klein was chairman of the Committee.

within the jurisdiction of the meat inspection regulations of the federal government.

Milk Hygiene

There are several items of importance that have presented themselves in the field of milk hygiene during the past year. Food inspection decision No. 200, issued by the U. S. Department of Agriculture, under date of August 26, sets forth revised and amended definitions and standards for milk and its products. The definitions were adopted by the Joint Committee on Definitions and Standards, composed of representatives of the U. S. Department of Agriculture, the Association of American Dairy, Food and Drug Officials, and by the Association of Official Agricultural Chemists, at its meeting January 18-29, 1926.

During the past three years the U. S. Public Health Service has been encouraging the adoption of a uniform effective milk sanitation program by the cities and states of the United States. Opposition to certain provisions of a standard milk ordinance which has been proposed by the U. S. Public Health Service has developed in certain quarters. At the Conference of State and Territorial Health Officers, held in Washington, May 25, 1926, the committee which had been appointed in 1925 to make a careful study of the proposed standard ordinance brought in a report to the effect that the Standard Milk Ordinance was suitable for general adoption by the health officers of the United States, provided that certain amendments and modifications be made in its requirements. This committee proposed forty modifications. Each of the modifications suggested was adopted by the Conference of State and Territorial Health Officers and accepted by the U. S. Public Health Service. Since the conference in May the U. S. Public Health Service has revised the Standard Milk Ordinance to conform to these modifications and the ordinance as modified has been published in Public Health reports, Volume 41, No. 30, under date of July 30, 1926.

While many of the modifications suggested by the Conference of Health Officers were of a minor character, some of them are of particular significance at this time. Modification 4, second part, deals with the temperature for the pasteurization of milk. For the past three years the U. S. Public Health Service's standard milk ordinance has defined the temperature for pasteurization as 142°F. to 145°F. The Committee set forth the opinion that, while there are many health officials ready to support a tempera-

ture limit as low as 142°F., further researches would be necessary to determine definitely the efficiency of this temperature and the Committee therefore recommended that pending the outcome of further research work the temperature required by the U. S. Public Health Ordinance should be 145°F., because this temperature gives the public the benefit of all doubt from a public health standpoint.

Another modification was in regard to accepting chlorin sterilization as being equally as effective as steam sterilization. The committee stated that inasmuch as this is a debatable point, it would be wise to include sterilization by the use of chlorin and expressly to invite such health officials who prefer to require steam, to do so.

While the Standard Milk Ordinance as modified will prove to be quite valuable to states and municipalities drafting milk regulations, criticism of some of its requirements is to be expected and as a result improvements made from time to time.

Both the Milk Committees of the State and Territorial Health Officials and the U. S. Public Health Service wish it distinctly understood by any city or state which adopts the standard ordinance that the spirit of the provisions suggested is that of *minimum requirements*. No attempt has been made to formulate a model milk ordinance.

The Standard Ordinance provides for four grades of raw milk and three grades of pasteurized milk. Grade A and Grade B raw milk must be produced from cattle subjected to a physical examination and tuberculin test conducted at least once every twelve months by a veterinarian approved by the health officer and the state live stock sanitary authorities. The regulations require that "All animals failing to pass the tuberculin test shall be branded with the letter 'T' or letters 'TB' on the shoulder, hip or jaw and removed at once and slaughtered under the direction of the health officer." No requirements concerning disinfection of premises following the tuberculin test are included in the Standard Ordinance. The Grade C and Grade D raw milk must not necessarily come from tuberculin-tested cows. The Standard Ordinance does not require even the physical examination of cattle producing either grade C or Grade D raw milk. To the casual observer it would appear that *minimum requirements* should include semi-annual physical examination in addition to an annual tuberculin test of cattle producing grade A and Grade B raw milk, and at least an annual physical exam-

ination and tuberculin test of cattle producing Grade C and Grade D raw milk.

During the past few years a wave has gone over the country toward the standardization of all milk regulations. One of the first moves toward the adoption of minimum requirements was suggested by the Special Milk Committee of the Central Atlantic States Association of Dairy, Food and Drug Officials, which association adopted minimum requirements for a higher and lower grade of pasteurized milk and minimum requirements for the production of certified milk. Opposition to the adoption of this report developed when it was presented at Trenton, last year, because no minimum requirements were set forth for a grade of raw milk other than *certified*. Many health officials took the position that no milk should be sold in the raw state other than certified. It does not appear that the position of these officials is tenable for the reason that many farms may produce raw milk of a grade equal to certified and under such requirements would be prohibited from marketing their product because there was no Medical Milk Commission in their locality from which they could secure certification. Some health departments are equipped to supervise the production of raw milk with efficiency equal to the average medical milk commission.

The Pennsylvania State Department of Health has conducted studies during the past year for the purpose of determining whether or not milk could be properly pasteurized by means of a process known as the "Electropure" method. By this method the milk is quickly heated to a temperature of approximately 160°F., after which it is immediately cooled and bottled. The report of the investigation was filed with the Advisory Board of the Department of Public Health, under date of April 13, 1925. The findings of the committee which made the investigation indicate that *B. coli* is almost entirely destroyed by the electrical method of heating. Tests for the destruction of tubercle bacilli showed that this organism sometimes survives the heat treatment applied. As a result of the investigations the Advisory Board adopted the following change in the state milk regulations approved April 4, 1923, covering the second paragraph of Section 2:

> For the purpose of this Regulaton pasteurized milk is hereby defined as milk which has been subjected to a temperature of not less than 145 degrees Fahrenheit or more than 14 degrees Fahrenheit for a period of not less than 30 minutes or milk which has been treated by a process which has been approved by the Secretary of Health and the Advisory Health Board and for the use of which a written permit has been issued by the Secretary of Health of the Pennsylvania Department of Health.

The Advisory Health Board also adopted the following resolution:

> That the report of the Committee appointed to study the Electropure Process be accepted with the change in the definition of pasteurized milk as adopted and that annual permits be issued by the Secretary of Health for the use of the Electropure Process of pasteurization in accordance with the requirements set forth in the report of the Committee and such additional requirements as the Secretary of Health may deem necessary.

In February, 1925, the U. S. Public Health Service published a bulletin entitled, "Commercial Pasteurization." This bulletin sets forth conclusions and results of tests made with milk inoculated with pathogenic organisms and treated in commercial pasteurizing apparatus in a plant in Endicott, N. Y. Much criticism by public health officials has been made concerning certain statements in this bulletin. These officials have claimed that the conclusions set forth in the bulletin are not substantially in agreement with the substance of the report. A paper entitled, "The Significance of U. S. Public Health Service Bulletin No. 147, Commercial Pasteurization" was presented before the Central Atlantic States Association of Dairy, Food and Drug Officials, at their annual meeting in Harrisburg, April, 1926. This paper purported to set forth certain discrepancies in this bulletin. At the 1925 meeting of the American Public Health Association a Committee on Milk and Dairy Products, representative of the various sections of that Association, was appointed to investigate this question. It is expected that this committee will have a report ready for the meeting of the Association to be held in Buffalo, next month.

Doubts which have arisen in the minds of some public health officials as to the efficiency of temperatures of 140 to 142°F. for 30 minutes, in killing tubercle bacilli in milk, have caused several municipalities to require that all milk distributed within their borders shall be from cows which have passed the tuberculin test, whether it is pasteurized or not. Several cities and boroughs in Pennsylvania have ordinances with these requirements in effect, as follows: Milford, Corry, Titusville, Cambridge Springs, Matamoras, Leechburg and Lancaster. A number of New Jersey municipalities have similar ordinances in operation. Accredited-herd testing and area work have been important factors in bringing about a condition with reference to tuberculosis of cattle which made the adoption of these ordinances practicable.

Two of the larger cities of the United States also have ordinances in operation which require all milk distributed within their limits to come from tuberculin-tested cows, whether it is to be pasteurized or not before delivery to the consumer. These cities are Baltimore, where these requirements went into effect on January 1, 1926, and Chicago, where the ordinance became operative April 1, 1926.

The Pennsylvania Dairy and Milk Inspectors Association held their second annual meeting in Harrisburg in January of this year. The meeting was very successful, with many veterinarians in attendance. The report of the proceedings of this meeting has been published in pamphlet form and may be secured from W. W. White, Secretary-Treasurer, Harrisburg, Pa. Membership in this Association is open to all veterinarians. No dues are charged. The Association welcomes the full cooperation of the veterinary profession and urges that veterinarians attend the annual meetings whenever possible.

IMPORTATION OF ANIMAL CASINGS RESTRICTED

Beginning December 1, 1927, animal casings (cleaned animal intestines used as sausage-containers) admitted into the United States from any foreign country must be accompanied by a certificate bearing the signature of the national government official having jurisdiction over the health of animals in the country where the casings originated. This requirement, recently announced by the United States Department of Agriculture, is officially designated as Bureau of Animal Industry Order 305.

The purpose of the order is to guard against the introduction into the United States of animal casings bearing the contagion of communicable diseases of animals. The required certificate calls for a description of the casings, identification marks on the packages, and the names and addresses of the consignor and consignee. Animal casings unaccompanied by the required certificate, those shipped in skins as containers, and those found upon inspection to be unclean or unsound when offered for importation, are not acceptable.

It is pointed out by B. A. I. officials that the origin of imported animal casings in many instances is now unknown and that they should be excluded unless known to be from healthy animals. The new order is an additional safeguard to human and animal health in the United States. Its enforcement will be under the supervision of the federal meat-inspection service.

FLIES, THEIR PATHOGENIC IMPORTANCE AND EXTERMINATION

By OSCAR GLUECK, *Pearl River, N. Y.*

Insects possess the ability to transmit pathogenic agents directly or indirectly. Mosquitoes, belonging to certain species of the *Anopheles*, are transmitters of malaria. The house-fly, *Musca domestica*, and its species have to be considered as transmitters and propagators of infectious diseases. This is a matter of fact, though not very well known. In spite of the various molestations caused by flies to human beings and animals, insufficient measures are taken to check their multiplication. The health of human beings and of domestic animals is in constant danger from the transmission of infectious diseases through flies.

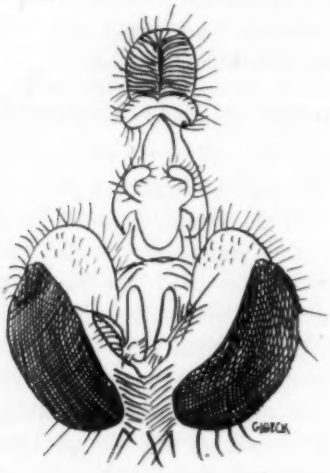


FIG. 1. The head, proboscis and mouth-parts of a house-fly, greatly enlarged. (After Martin)

The most important role played by flies in transmitting infectious diseases occurs when the causative agent is ejected with the feces, through the agency of which they are deposited onto human food, such as milk, butter, cheese, fruit and candy.

Celli showed, in 1888, that virulent tubercle bacilli were found in flies which had fed on the expectorations of consumptives, and also typhoid bacilli were found in flies fed with pure cultures of that organism. Buchanan demonstrated anthrax bacilli in the intestines of flies which had fed on carcasses of animals dead

of that disease. Dr. Graham Smith states that Simons, in 1892, found the germ of cholera in flies caught in a cholera mortuary.

It is also proved that various germs, eaten by non-stinging flies, pass through their digestive apparatus without losing their pathogenicity or their ability to multiply.

The procedure with which the fly takes up its food is as follows: The mouth of the fly consists of a proboscis, which ends in two flabby pads, which can be protruded and applied to the food. There are no teeth, but each mouth-pad has some hard ridges which can be used as rasps for breaking up small hard objects in the food; the saliva of the flies does the rest of the mastication. The saliva is poured out and a thick paste is made. The mouth pads are then applied and the paste is sucked up and swallowed. As the fly goes from place to place, she repeats the procedure. There is no doubt that germs are swallowed by flies. The internal digestive apparatus of the fly is very simple. The throat appears

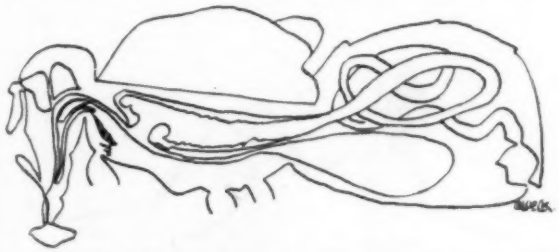


FIG. 2. Diagram showing the digestive apparatus of a fly. (After Martin)

to be a winding structure, connected with the proboscis, from which a long gullet leads to the stomach and intestines. A crop is connected with the gullet by means of a long tube; this crop is a distensible bag where food is stored until hunger requires its digestion. After a meal, flies occasionally regurgitate drops of food from their mouth, containing germs which may contaminate human food.

In this manner infections occur with typhoid (therefore the name typhoid fly), also infantile enteritis, dysentery, cholera, tuberculosis, eggs of tenias and roundworms (*Tenia serrata, Tenia solium, Tenia saginata, Tenia echinococcus, Ascaris megalocephala, Ascaris lumbricoides, Oxyuris vermicularis, Ankylostomum duodenale*). There is proven a possibility of transmission of those pathogenic germs which live in the blood-stream of human beings and animals, namely anthrax,hemorrhagic septicemia and recurrent fever. In the same manner diseases and conditions

like lepra, trachoma, phlegmon and suppuration are conveyed. It has not yet been proven that flies disseminate pox or foot-and-mouth disease, but it is very often suggested that they do. It is not necessary for these pathogenic germs to develop in the fly, as is the case of trypanosomes in malaria. This accounts for their easier transmission.

Summarizing these facts, fighting the fly plague is very important from the standpoint of combating diseases in human beings and animals.

The most competent individual to conduct an anti-fly campaign is the veterinarian in cooperation with the local health authorities, because he knows most about the local conditions. To eradicate flies, we first must have knowledge, where they must be attacked. That means that we must know something about the life cycle of the fly, because we get the best results with destruction of the eggs, maggots and fly-nymphs.

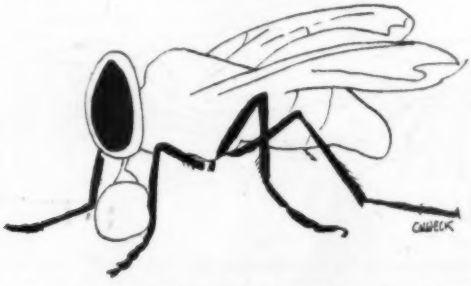


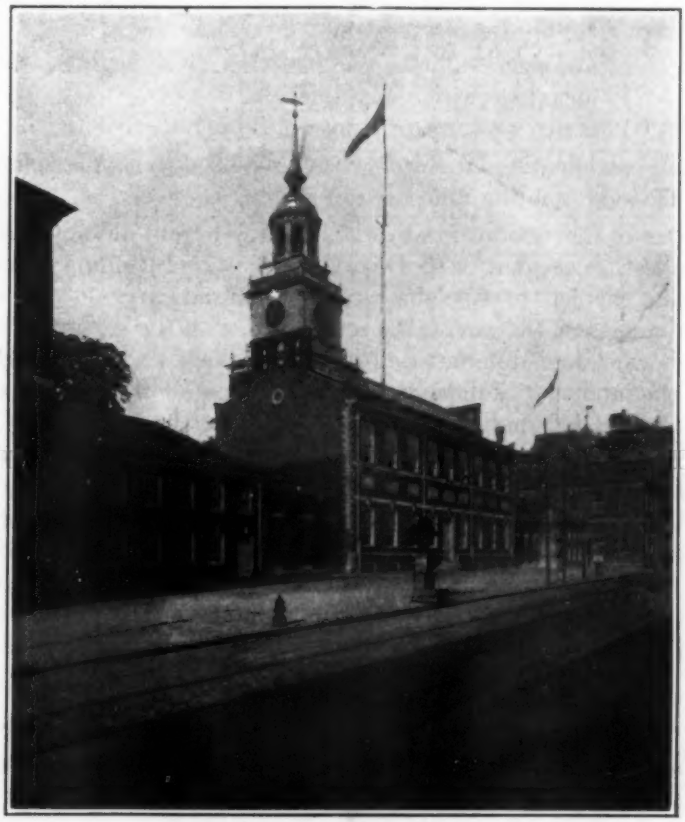
FIG. 3. A fly regurgitating fluid after a meal. (After Martin)

Stable manure is the most common breeding place for the fly. The female likes to lay her eggs there, and in the horse dung the fly maggot lives for five days and then becomes a nymph. This stage lasts another five days, after which the fully developed fly emerges. It is during these stages that the insect can be found collected together in numbers and can be easily destroyed.

The stables and their surroundings should be kept clean. Liquid and solid manures should be removed daily, and spread upon plowed land or placed in piles at least one-half mile from dwellings or stables. Should it be impracticable to remove the manure from the stables, it may be piled with frequent layers of lime or powdered borax (1 Kg. to each cubic meter of manure), after which 8 to 10 gallons of water may be added to each cubic meter, in which treatment the edges of the pile should receive most of the lime or borax, as the maggot will crawl from the

center of the pile and gather at the sides and top. Cesspools, garbage pens and privies should be spinkled daily with powdered copperas, or with a fly-killing mixture. A good mixture is the following: coal tar, 80 grams, and resin soap made of 5 parts resin with 20 parts soda, of which mixture 5 parts may be added to 100 parts of water. Any offal that cannot be removed promptly may be sprinkled with the same mixture.

Flies may be kept from stables by using currents of air, using screens at doors and windows, putting strips of polmac on the window-sashes, sprinkling the walls with creolin solution or whitewash, either alone or with the addition of formalin. Good results will also follow the use of formalin milk (formalin, 25; milk, 25; sugar water, 60) and a few slices of bread in open plates protected from draughts of air.



Independence Hall, Philadelphia.

BANG BACILLUS DISEASE (BOVINE INFECTIOUS ABORTION)

Agglutination Test Results Obtained By Twelve Laboratories On Duplicate Sets Of Five Bovine Sera

By M. F. BARNES *and* A. L. BRUECKNER

Pennsylvania Bureau of Animal Industry, Harrisburg, Pa.

A set of five bovine sera, numbered 1, 2, 3, 4 and 5, was sent by the writers on March 26, 1927, to each of twelve different laboratories. On the same date letters were sent to the twelve laboratories asking their cooperation in conducting comparative tests. Each laboratory was asked to test each serum in dilutions of 1 to 25, 1 to 50, 1 to 100, 1 to 200, 1 to 500 and 1 to 1000; to make the readings after incubation for about forty-two hours; and to record the result of each dilution in accordance with the following key:

Minus sign (—), meaning negative, or no agglutination.
P, meaning partial agglutination.
Plus sign (+), meaning complete agglutination.

Each participating laboratory was also asked to supply a sample of the agglutinating fluid used in making the test.

One of the laboratories to which sera were sent did not conduct the test on account of shortage in help, etc. Including Pennsylvania, this left twelve laboratories which did carry out the tests and reported the results as requested, with the exception that Delaware used different dilutions than those requested. Some of the laboratories did not supply a sample of the agglutinating fluid used in conducting the test. Under the heading, "Comments and Notations," mention is made with reference to agglutinating fluid in each case where it was supplied. The heading, "History of Sera," shows the source of the individual sera in each set of five and the steps in preparation for mailing to the various laboratories. Under this heading it is shown that each set of five sera represented a duplicate of each and every other set. The results obtained by each laboratory are shown in table I.

HISTORY OF SERA

Serum 1 was from a bull, approximately two years of age and maintained in an abortion-infected herd. Serum from this bull

Received for publication, June 23, 1927.

TABLE I.—*Comparative results of the agglutination test for Bang bacillus disease on five sera sent from the Pennsylvania Laboratory, March 26, 1927*

SERUM	1 (BULL) B. A. I. 21781						2 (COMPOSITE NEGATIVE)						3 (COMPOSITE POSITIVE)						4 (DUPLICATE OF 2)						5 (DUPLICATE OF 1)					
DILUTION	25	50	100	200	500	1000	25	50	100	200	500	1000	25	50	100	200	500	1000	25	50	100	200	500	1000	25	50	100	200	500	1000
1. Minnesota	+	+	+	+	+	+	—	—	—	—	—	—	+	+	+	+	+	+	—	—	—	—	—	—	+	+	+	+	+	P
2. Michigan	+	+	+	+	—	—	P	—	—	—	—	—	+	+	+	+	+	+	P	—	—	—	—	—	+	+	+	+	P	—
3. U. S. B. A. I.	+	+	+	—	—	—	—	—	—	—	—	—	+	+	+	+	+	+	—	—	—	—	—	—	+	+	+	—	—	—
4. Maryland	+	+	+	—	—	—	—	—	—	—	—	—	+	+	+	+	+	+	—	—	—	—	—	—	+	+	+	—	—	—
5. Pennsylvania	+	+	+	P	—	—	—	—	—	—	—	—	+	+	+	+	+	+	—	—	—	—	—	—	+	+	+	P	—	—
6. New Jersey	+	+	+	P	—	—	—	—	—	—	—	—	+	+	+	+	+	+	—	—	—	—	—	—	+	+	P	P	—	—
7. Delaware	+	+	—	—	—	—	—	—	—	—	—	—	+	+	+	+	+	+	P	—	—	—	—	—	P	P	—	—	—	—
8. Missouri	+	+	+	P	—	—	—	—	—	—	—	—	+	+	+	+	+	+	—	—	—	—	—	—	+	+	+	+	P	—
9. Cornell	+	+	+	—	—	—	—	—	—	—	—	—	+	+	+	+	+	+	—	—	—	—	—	—	+	+	+	—	—	—
10. Storrs	P	P	+	+	+	P	P	—	—	—	—	—	P	P	P	P	+	+	P	—	—	—	—	—	P	P	+	+	P	—
11. Illinois	+	+	+	+	+	—	P	—	—	—	—	—	P	P	+	+	+	+	P	—	—	—	—	—	+	+	+	+	+	P
12. Georgia	+	+	P	—	—	—	—	—	—	—	—	—	+	+	+	+	+	+	P	—	—	—	—	—	+	+	P	—	—	—

Minus sign — means negative, or no agglutination.
P means partial agglutination.
Plus sign + means complete agglutination.

(B. A. I. 21373) was tested by the Pennsylvania laboratory, February 19, 1927, showed complete agglutination in dilutions of 1 to 25 and 1 to 50, and partial in dilutions of 1 to 100 and 1 to 200, and was reported *Positive*. The owner had sold him subject to a blood-test and, on or about March 11, sent a sample of serum to another laboratory which reported it *Negative*. The sample of March 11 was not a duplicate of that tested by the Pennsylvania laboratory on February 19, and in order to have as nearly exact duplicates as possible, tested by different laboratories, it was decided to collect sufficient blood to divide the serum into several parts.

Blood was collected from this bull on March 24, brought to the laboratory as B. A. I. 21781 and kept at room temperature for 24 hours, until March 25, when it was centrifuged. The serum was then poured into a sterile bottle and placed in the refrigerator, where it remained until March 26. On March 26 the serum was shaken and a part of it placed in each of 26 sterile and labelled vials. Of these, 13 were numbered "1" and 13 were numbered "5."

Serum 2 was a composite mixture of negative sera from a herd which had been negative to several repeated tests. This mixture consisted of sera from blood samples from approximately 25 animals which were collected on March 19, brought to the laboratory and placed in the refrigerator about 10 hours after the time collected. On March 20 they were examined and prepared for testing, then remained in the refrigerator until March 21. The test was started on the 21st and read on the 23rd, with the result that all were negative. A retest was started on the 21st and read on the 23rd, with the result that all were again negative. Serum from these several samples was poured into a common container on the 25th and placed in the refrigerator, where it remained until the 26th, when it was handled as number 1. It was divided into 26 lots, of which 13 were numbered "2" and 13 were number "4".

Serum 3 consisted of 14 sera which on routine tests had shown complete agglutination in the dilution of 1 to 200. None of them was tested in higher dilutions. Five of these were shipped to the laboratory, received March 17 and tested March 19; nine were brought to laboratory on the 18th and tested on the 19th.

All of these were kept in the refrigerator until March 25, when the serum from all of them was poured into a common container and returned to the refrigerator, where it remained until the

26th, when it was handled as sera 1 and 2, except that it was divided into only 13 parts and each part numbered "3."

Serum 4, duplicate of serum 2.

Serum 5, duplicate of serum 1.

The above sera were set apart into thirteen groups, each of which was made to contain a set of sera numbered 1, 2, 3, 4 and 5. These were all placed in the refrigerator and after about one hour were packed and, excepting the set for Pennsylvania, were mailed at 6:30 p. m., on March 26. The Pennsylvania set was kept at room temperature for 24 hours, in order to meet some of the conditions incident to shipping.

Comments and Notations

The principal reason for sending the five sera to several laboratories was to have either the Pennsylvania laboratory's results on serum 1 and the duplicate, serum 5, confirmed, or to have it shown by the results of tests by a number of laboratories that the Pennsylvania laboratory's diagnosis was wrong.

The Pennsylvania test was started on March 29 and completed March 31. It was thought that by this time serum sent to other laboratories would have reached its destination. Reports from other laboratories indicated that tests with few exceptions were run at about the same time in the different laboratories. Some started the test a day ahead of Pennsylvania and some a day or two later.

No preservative was added to the serum before leaving the Pennsylvania laboratory. No report indicated that the serum arrived in bad shape. On the other hand, most reports indicated that it arrived in good shape.

The key (—, + and P) and the dilutions (1 to 25, 1 to 50, 1 to 100, 1 to 200, 1 to 500 and 1 to 1000) were requested in this test to conform with testing which had previously been done by five laboratories. In all tests the writers prefer to, and do, record the results obtained in the individual dilutions as either —, +1, +2, +3, or +4; — meaning negative; +1, +2 and +3 meaning partial but representing the degree of agglutination and clearing; and +4 meaning complete agglutination. The letter "P" indicates, as used in Pennsylvania, a positive diagnosis of the disease. This conforms with the system used in recording positive diagnoses of other diseases.

In the comparisons of agglutinating fluids received from the different laboratories, the comparisons were made with Penn-

sylvania's fluid (Lab. 5) which was considered as having a density of 1, and compares with tube 1 of the McFarland nephelometer after the formula given by Kolmer. In making up agglutinating fluids we prefer to make comparisons with samples of fluid from previous lots. The Pennsylvania fluid was used here as a standard for comparison only. That from any other laboratory could have been used for the same purpose. The nephelometer was used also in making density comparisons of the various fluids.

Laboratory 1 (Minn.): Reported results on April 4. No sample of agglutinating fluid was supplied.

Complement-Fixation Test

Serum	Dilutions			
	.1	.04	.02	.005
1	+	+	+	—
2	—	—	—	—
3	+	+	+	+
4	—	—	—	—
5	+	+	+	—

Laboratory 2 (Mich.): Reported April 1. Test dated March 30. "The rapid method gave the reactions as the slow method." No sample of agglutinating fluid was supplied.

Laboratory 3 (U. S. B. A. I.): Reported April 7. Agglutinating fluid density, 1.2.

Laboratory 4 (Md.): Reported April 4. Considered animals 1, 3 and 5 as positive. Test fluid density, 1.0.

Laboratory 5 (Pa.): Test made March 29 to 31. Test fluid density, 1.0

Laboratory 6 (N. J.): Reported April 5. Fluid density, 1.0

Laboratory 7 (Del.): Reported April 1. Test report dated March 30. Fluid density, 1.0

In commenting upon these samples, it was stated:

> I wish to state samples 1, 2 and 3 gave no difficulty in reading, they appeared to be quite clear-cut. In sample 4 there appeared to be partial agglutination in the first tube. In sample 5 I was unable to decide whether the agglutination was partial or complete in the first tube. It did not appear to be typical agglutination, and I lean more towards making it partial than positive.

This laboratory did not use the requested dilutions. The results were reported as follows:

Serum	Dilutions						Results
	1–35	1–60	1–110	1–210	1–510	1–1010	
1	+	+	—	—	—	—	Low reactor
2	—	—	—	—	—	—	Negative
3	+	+	+	+	+	+	Positive
4	P	—	—	—	—	—	Negative
5	+ or P	P	—	—	—	—	Slightly suspicious

Laboratory 8 (Mo.): Reported April 6. Tested April 1. Fluid density, 0.7

In the report it is stated:

> We have applied the complement-fixation test and the slow agglutination, and the Huddleson rapid method. The close accord of all three methods I think can leave no doubt as to the diagnostic conclusions that the samples 1, 3 and 5 are from animals carrying the *B. abortus* antibodies, and probably infection also, and that the samples 2 and 4 are from animals whose serum contained none of these antibodies at the time these samples were drawn, whatever their clinical history may be.

The complement-fixation dilutions and results were as follows:

Serum	Dilutions					Diagnosis
	.1	.05	.03	.01	.005	
1	+	+	+	—	—	+
2	—	—	—	—	—	—
3	+	+	+	+	+	+
4	—	—	—	—	—	—
5	+	+	+	+	+	+

Laboratory 9 (Cornell): Reported April 8. Test started March 30. Fluid density, 2.0

Laboratory 10 (Storrs Exp. Sta.): Reported April 4. Sera were received March 28. No test fluid was supplied. The report states that the sera were received in good condition, with no evidence of spoilage; however, that the reactions were not as clean-cut as those to which they were accustomed. They ran the tests with two different antigens and each individual test was run in duplicate. The report was given as a "summary."

Laboratory 11 (Illinois): Reported March 30. Test started March 28. Fluid density, 0.8

Samples were run in duplicate by two different persons. The results marked "T" are included in the table.

Laboratory 12 (Georgia): Reports of results dated April 9. Test chart dated March 31. Sera 1, 3 and 5 were reported positive, and sera 2 and 4 negative. Test fluid density, 1.2

Concluding Remarks

We were much delighted to have the cooperating laboratories so well confirm the Pennsylvania results, both as to serum 1 and its duplicate, serum 5, and as to the composite negative serum (2) and the composite positive serum (3). From the standpoint of pronouncing these sera either positive or negative we consider that there was approximately 99 per cent agreement in the results reported by the twelve laboratories.

The cooperation of the several laboratories which participated in these tests is greatly appreciated by the writers.

Meet thy friends in the Friendly City—
Philadelphia, September 13-14-15-16

NEWS ITEMS

The city authorities of Ottawa, Ill., have been considering the adoption of a new city ordinance governing dogs. The existence of rabies in the vicinity has prompted this action.

According to the Milford (Indiana) *Mail*, Kosciusko County is threatened with an outbreak of hog cholera because th farmers are without a county agent, for the first time in a number of years.

Farm Advisor Glick, of Franklin County, Ill., is advising his constituents that neither the moon, lye, pills nor minerals will "immune" hogs from hog cholera, "the worst disease that affects hogs."

It is reported that one of the effects of the new compulsory automobile insurance laws in Massachusetts is to popularize the horse again. The law practically doubled insurance rates on trucks, and operators are again investigating the possibilities of horse power.

FACTORS INFLUENCING THE CONTROL OF BACILLARY WHITE DIARRHEA

By F. P. MATHEWS, *Lafayette, Ind.*

Purdue University Agricultural Experiment Station
Veterinary Department

There are many factors associated with the control of an infectious disease that may not be appreciated until definite measures are adopted for its control. The extensive use of the agglutination test for the control of bacillary white diarrhea has emphasized the importance of certain factors that heretofore have been only slightly appreciated. The present methods recommended for the control of bacillary white diarrhea that are based on the agglutination test as a diagnostic criterion have given satisfactory results as a whole. The plan of testing the breeding flock annually, as adopted by many poultrymen, has had a controlling influence on the disease in baby chicks, and a gradual decrease in the percentage of reactors in the breeding flock indicates that it is possible to eradicate the disease. However, the opposite of this condition is occasionally encountered. For example, in a flock that has been tested one or more seasons, the second or third test may show a heavy increase in the number of reactors. If all the reactors have been removed after the previous test or tests, and the owner has apparently made an honest effort to control the disease, such a state of affairs requires an explanation, both to the owner and veterinarian who has applied the test.

Just prior to the hatching season of 1926, a poultryman reported a heavy increase in the percentage of reacting birds in one of his breeding flocks. This flock numbered 349 birds; 285, or about 80 per cent, gave positive reactions to the agglutination test. In the other flocks the infection was not so heavy and varied between 15 and 45 per cent. All of the birds, except the pullets, had been tested the previous year. Only 5 per cent had reacted, and these birds had been removed. A member of the Department visited the poultry farm and, together with the owner and veterinarian, made a study of the condition. The fact that there had been some loss from bacillary white diarrhea in chicks the previous spring accounted for the increase in the

Received for publication, June 23, 1927.

percentage of reactors in some of the flocks made up largely of pullets, but did not explain the condition that existed in the first flock tested, as these birds were two and three years of age. It was finally brought out that the owner practiced the feeding of infertile eggs gathered from the incubators, and that most of these eggs had been fed to this flock. The possibility that some of these eggs were infected with *Bact. pullorum* offered the only logical explanation for this unusual increase in the percentage of reacting birds.

Two other cases with practically the same history as the above have been brought to the attention of the Department. In one flock there was this difference: A number of birds died following the feeding with infertile eggs. Jones[1] also reports a case in which a high mortality resulted from *Bact. pullorum* infection following the feeding of infertile eggs.

Fowl Typhoid Causes Increase in Reactors

It is obvious that a heavy increase in the percentage of reactors in a flock that has been given several annual tests is not always the result of feeding pullorum-infected eggs. Three outbreaks of fowl typhoid that were responsible for an increase in the number of reacting birds in tested flocks were investigated the past year. Reacting birds from each of these outbreaks were autopsied and the causative organism was isolated and identified. In one case *B. gallinarum* was isolated from the heart-blood of a hen sick at the time she was autopsied. It would have been possible in this case to have spread the disease at the time of collecting the blood sample by failure to clean the knife-blade or needle properly after opening the vein. The advisability of examining the flock for sick birds at the time the blood samples are collected may be emphasized.

Since an outbreak of fowl typhoid may occur during the interval between the annual tests, causing the infected birds to react to the agglutination test the same as when infected with bacillary white diarrhea, we may expect occasionally to find a flock that reacts heavily to this diagnostic test, not because of *Bact. pullorum* infection, but as a result of infection with *B. gallinarum*. The pathogenesis of both bacillary white diarrhea and fowl typhoid is very similar in many respects, and it is therefore fortunate that we have one test capable of detecting the two diseases. Our postmortem records show that the latter disease is diagnosed about as often as fowl cholera, which

points to its possible significance when testing for *Bact. pullorum* infection.

The possibility of the spread of bacillary white diarrhea among mature birds has been considered. Field observations would lead one to believe that the infection is not spread by the droppings of the ovary-infected, but otherwise healthy hen. However, there is a possibility for eggs laid by infected hens to become broken and be eaten by healthy birds. Doyle[2] has reported the results of experiments in which baby chicks appeared to have contracted the disease from reacting hens. Rettger, Kirkpatrick and Stoneburn[3] reported an experiment in which the spread of pullorum infection from infected to healthy hens occurred. The possibility of the spread of the infection by eating eggs from the infected hens was not considered by these investigators.

Infected Eggs Spread Disease

Since the feeding of infertile eggs to mature birds has been followed by heavy infection of the flock with *Bact. pullorum*, it was decided to demonstrate this method of spreading the disease. Eight producing pullets were selected from a flock that was free from *Bact. pullorum* infection. These birds were tested twice and none reacted. Twenty other birds from this flock were used in another experiment and, when autopsied, were found to be free of the infection.

Eggs were collected from reacting hens, incubated for a period of two weeks and then cultured for the presence of *Bact. pullorum*. Three infected eggs were obtained and fed to the eight pullets. Egg-production ceased in about one week after feeding the eggs, but no other ill effect was noticed. Table 1 shows that all of the birds gave positive reactions two weeks after eating the eggs. All were killed and upon autopsy six of the birds were found to have pathological ovaries. *Bact. pullorum* was isolated from the diseased ovaries. Bird 115 had not resumed egg-production and her ovary was atrophic and unsuitable for cultural diagnosis. Bird 106 was autopsied six weeks after the infected eggs were fed and showed a normal ovary, from which *Bact. pullorum* could not be isolated.

There is no doubt but that the feeding of infected eggs to mature birds results in ovarian infection and, judging from field experiences, it is evident that infertile eggs are frequently in-

TABLE I.—*Results obtained by feeding disease-free hens Bact. pullorum-infected eggs on March 15, 1926*

No. of Bird	Dates of Agglutination Tests					Condition of Ovary and Cultural Diagnoses
	2-23	3-15	4-2	5-11	8-15	
106	—	—	+	0	0	Normal. *Bact. pullorum* not isolated
111	—	—	+	+	+	Pathological. *Bact. pullorum* isolated
113	—	—	+	+	+	Pathological. *Bact. pullorum* isolated
114	—	—	+	+	+	Pathological. *Bact. pullorum* isolated
115	—	—	+	+	+	Atrophic. *Bact. pullorum* not isolated
116	—	—	+	+	+	Pathological. *Bact. pullorum* isolated
120	—	—	+	+	+	Pathological. *Bact. pullorum* isolated
121	—	—	+	+	+	Pathological. *Bact. pullorum* isolated

fected, thus contributing materially to the spread of bacillary white diarrhea when fed to chickens.

The question naturally arises as to the possibility of controlling bacillary white diarrhea in flocks that are heavily infected. The results obtained in the flock in which from 15 to 80 per cent of the hens in the different lots reacted, are of particular interest. This poultryman was quite concerned about the possibility of bacillary white diarrhea developing in the chicks sold during the 1926 season and, therefore, made special inquiry as to the losses sustained. In so far as he could determine, there were no losses from bacillary white diarrhea. The hatchability and livability of the chicks after the reactors were removed were exceptionally good, with the exception of one lot of 2000 in which the direct cause of loss was due to exposure. Prior to the hatching season of 1927, the agglutination test was again conducted on his flocks and only three per cent of the birds reacted.

Experiment with Feces from Infected Hens

The possibility of the spread of bacillary white diarrhea through the droppings of disease-carrier hens is an open question. The following experiment was undertaken in order to test this possible source of infection. Fifty chicks, twenty-four hours old, were divided into three lots. To the food of lot 1 was added 5 per cent fresh feces from eight infected hens. Lot 2 was brooded in a pen that communicated with a second pen in which there were three infected hens. The chicks in lot 2 mingled

freely with the hens. Lot 3 was a control lot. This experiment was repeated, using 61 chicks of the same age. The only variation in the experiment was in the lot having access to the pen containing the infected hens. In this case one hen mothered the baby chicks. All the chicks were killed when two to three weeks of age, and bacteriological examinations were made for *Bact. pullorum*. All chicks that died during the experiment were examined in a like manner. No lesions of bacillary white diarrhea were present in any of the birds, and *Bact. pullorum* could not be obtained from a single case.

It was thought probable that recently infected mature birds might eliminate *Bact. pullorum* in the feces. Fresh feces were collected from eight hens three weeks after feeding eggs infected with *Bact. pullorum*. Five per cent of the feces was mixed with the feed and fed to twelve chicks twenty-four hours of age. The twelve chicks were killed at two weeks of age and examined for *Bact. pullorum* with negative results.

Failure to demonstrate *Bact. pullorum* in the feces of sixteen infected hens should not be interpreted as positive proof that infection from this source never results, but rather that its significance in the control of bacillary white diarrhea is of minor importance. This does not eliminate the possiblity of spread through cohabitation, since the eating of broken eggs is of common occurrence in all flocks. It is highly probable that accidentally broken and consumed eggs from infected birds offer a better explanation for the spread of the disease in mature birds through cohabitation than through the droppings of infected individuals.

Summary

The feeding of eggs infected with *Bact. pullorum* is shown to produce ovarian infection in mature birds. Field results indicate that infertile eggs from an incubator are frequently infected and are therefore responsible for the spread of bacillary white diarrhea when fed to chickens.

Fowl typhoid has been found to be responsible for a high percentage of reactors in some flocks.

The feces of *Bact. pullorum*-infected, but otherwise healthy, hens were not found to contain the infection.

References

[1]Jones, F. S.: An outbreak of an acute disease in adult fowls due to *Bacterium pullorum*. Jour. Med. Res., xxvii (1913), 4, pp. 471-479.

[2]Doyle, T. M.: Bacillary white diarrhea of chicks. Jour. Comp. Path. and Ther., xxxviii (1925), 4, pp. 266-282.

[3]Rettger, L. F., Kirkpatrick, W. F. and Stoneburn, F. H.: Bacillary white diarrhea of young chicks. Third report Conn. Storrs Agr. Exp. Sta. Bul. 74 (1912), pp. 153-185.

A COMPARISON OF THE AGGLUTINATION TEST AND THE INTRADERMAL TEST IN THE DETECTION OF BACILLARY WHITE DIARRHEA

By PHILIP R. EDWARDS *and* FLOYD E. HULL

Department of Veterinary Science, Kentucky Agricultural Experiment Station, Lexington, Ky.

Within the past decade several attempts have been made to evolve a satisfactory intradermal test for *Bact. pullorum* infection in fowls. Ward and Gallagher,[1] in 1917, proposed an antigen consisting of a thirty-day broth culture of *Bact. pullorum* concentrated to one-fifth of its original volume. Scherago and Benson,[2] in 1919, reported unsuccessful results with the antigen of Ward and Gallagher. Not only did they find a lack of specificity in the test, but 85 per cent of the birds tested in this manner became positive reactors to the agglutination test.

Fuller,[3] in 1923, proposed an antigen which was essentially the same as that employed by Ward and Gallagher. There is no record of a comparison of the agglutination and intradermal tests in this work. It is based upon chick mortality before and after testing and upon macroscopic pathology of the ovaries of certain birds which were autopsied. Fuller concluded that (a) the intradermal test detects a large percentage of infected individuals but does not detect them all in heavily infected flocks and (b) that only a very small percentage of the non-carriers react to the test.

Broerman,[4] in 1927, described an antigen for intradermal testing which was prepared by a different method from that of Ward and Gallagher. In this method *Bact. pullorum* was grown for 48 hours on agar, the organisms washed off with sterile distilled water and centrifuged. They were washed four times in this manner, carbolized, and allowed to stand until killed. This suspension was then diluted with 0.5 per cent phenol to a density of tube one on the McFarland nephelometer. Comparative agglutination and intradermal tests were run on two flocks. In one flock sixteen birds reacted to one or both tests. On a retest, six birds gave doubtful or positive reactions to the intradermal test. Four gave positive or doubtful reactions to the agglutination test. All of the six birds showed macroscopic ovarian lesions.

Received for publication, June 30, 1927.

No attempts to culture the ovaries are reported nor are the methods used in the agglutination test recorded. Broerman concluded that the intradermal test is of value in detecting infected fowls.

Graham and Tunnicliff,[3] recently reported on comparative studies of the agglutination and intradermal tests with post-mortem examination of a number of reacting fowls. The exact method of preparing the intradermal antigen is not given. From the discussion following the presentation of this paper, it was inferred that their product was an alcoholic precipitate of cultures of *Bact. pullorum*. The agglutination test was carried out at dilutions of 1 to 10 and 1 to 100. Agglutination in either dilution was considered as diagnostic. The turbidity of the antigen used in the agglutination tests is not given.

In testing 158 birds they found 48.7 per cent positive to agglutination and 85.6 per cent positive to the intradermal test. Ovarian lesions were observed in 91.7 per cent of the birds at autopsy. Cultures were taken from the ovaries of seventeen birds which were positive to agglutination. Ten of these yielded *Bact. pullorum*. Twenty-three birds giving positive intradermal reactions were cultured. *Bact. pullorum* was recovered from the ovaries of ten.

Superficially the figures given by Graham and Tunnicliff seem to favor the intradermal tests. It has been our experience in this laboratory that the gross appearance of the ovary is not a reliable criterion upon which to base a diagnosis of bacillary white diarrhea. When one takes into consideration the small number of birds which were positive to the intradermal te t and negative to the agglutination test, from which *Bact. pullorum* was recovered, the figures become less impressive.

Experimental

The present work is an attempt to determine the efficiency of a commercial product which has been put on the market under the name, pullorin, and is intended to be used for testing fowls for bacillary white diarrhea. A solution of this substance injected intradermally is said to indicate the infection by producing an edematous swelling in birds carrying *Bact. pullorum*.

The method of preparation of this product is not known. The literature of the commercial laboratory selling this preparation states that they have obtained their best results in the manufacture of an intradermal agent through "precipitating the

active principles of certain strains of the *S. pullora* organisms by methanol." It is dispensed in the form of a dry powder which is to be dissolved in sterile physiologic salt solution shortly before being used.

Birds from five flocks were subjected to agglutination and intradermal tests at the same time. Certain birds were selected and postmortem examinations performed.

METHODS

The agglutination tests were run using the following technic: The birds were starved for 24 hours, bled, and the blood samples placed in the ice-box overnight. The following morning the tests were set up. The antigen employed in the tests was made up of five strains of *Bact. pullorum*, all of known agglutinability. The antigen was made up to a denisty of 0.5 on the McFarland nephelometer. The saline solution used to dilute the antigen contained 0.85 per cent NaCl and 0.3 per cent phenol. Antigen was used in the amount of 2 cc. The tests were run in two dilutions, 1 to 40 and 1 to 80. The serum was measured with serological pipettes, graduated to .01 cc. After the serum was placed in the antigen tubes, the tubes were thoroughly shaken and incubated 48 hours at 37°C. The tests were read at the end of forty-eight hours, allowed to stand at room temperature for 24 hours and read a second time. Agglutination in either dilution was considered diagnostic.

In making the intradermal injections, a syringe graduated to .04 cc was used with a 26-gauge intradermal needle. One twenty-fifth of a cubic centimeter was injected into each fowl. The injection was made intradermally as near the ventral border of the wattle as possible. The pullorin was dissolved in sterile physiologic saline solution, furnished by the laboratory making the product. It was allowed to stand for one hour to permit the insoluble portion to subside. The insoluble material was avoided in filling the syringe.

Three different lots of pullorin, as evidenced by the serial numbers, were used in these tests. There was a marked lack of uniformity in these different lots of pullorin. This lack of uniformity in the product was evidenced by the difference in the amount of insoluble material and the color of the solution.

The tests were read at the end of twenty-four hours. All soft, edematous, swellings were considered positive. Hard swellings were read as negatives.

At autopsy the entire ovary was removed. Both large and small ova were examined for gross lesions. All ova showing any abnormality were cultured. In culturing, the ovum to be examined was seared with a heated spatula, the ovisac punctured with a sterile knife and the contents of the ovum streaked on agar slants. After the ovary had been examined the other internal organs were examined for pathological changes. Where any lesions were found, cultures were made. A search was made throughout the body for cysts and where any were found the contents were cultured.

Colonies developing on the tubes inoculated were examined morphologically. All colonies which yielded Gram-negative rods were planted in dextrose, maltose, dulcitol and lactose broth. The broth was composed of 1 per cent peptone and 0.3 per cent meat extract. The reaction was adjusted to pH 7.2 Andrade's indicator and the fermentable substances were added in amounts of 1 per cent. The fermentable substances were not heated but were sterilized separately by filtration and added to the previously sterilized broth. After the addition of the fermentable substances, all tubes were incubated at 37°C. for 72 hours to insure sterility. Only those cultures which produced acid in dextrose and failed to ferment maltose, dulcitol and lactose, after incubation for seven days at 37°C., are recorded as *Bact. pullorum*.

Results

The results of the agglutination and the pullorin tests are recorded in table I. In this table the birds are divided into four groups, on the basis of their reactions to the two tests. These groups are composed of (a) birds giving a positive reaction to the intradermal test which failed to react to the agglutination test; (b) birds reacting positively to the agglutination tests which failed to react to the intradermal test; (c) birds giving positive reactions to both tests; (d) birds giving negative reactions to both tests. The figures are given separately for each flock tested and as a total.

From table I it can be seen that there is a very poor correlation between the pullorin and agglutination tests. Many of the birds reacting positively to the agglutination test gave negative intradermal reactions, while many birds giving positive intradermal reactions were negative to agglutination. Only 47.6 per cent of the birds which were positive to the agglutination test were reactors to the intradermal test. The number of agglutination

TABLE I—*Reactions to agglutination and intradermal tests*

Flock No.	1		2		3		4		5		Total	
Number of birds in flock	75		91		74		87		328		655	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Agglutination negative, pullorin positive	7	9.3	11	12.2	8	10.8	24	27.6	33	10.0	83	12.8
Agglutination positive, pullorin negative	22	29.2	15	16.7	3	4.0	15	17.2	22	6.7	77	11.1
Agglutination positive, pullorin positive	23	30.75	20	22.2	5	6.8	6	6.9	16	4.8	70	10.6
Agglutination negative, pullorin negative	23	30.75	45	49.9	58	78.4	42	48.3	257	78.5	425	65.5
Positive to agglutination (%)	59.95		38.9		10.8		24.1		11.5		21.7	
Positive to pullorin (%)	40.05		34.4		17.6		34.5		14.8		23.4	
Agglutination reactors detected by pullorin (%)	51.1		57.1		62.5		28.6		42.1		47.6	
Pullorin reactors detected by agglutination (%)	76.7		64.5		38.5		20.0		32.6		45.7	
Pullorin reactors negative to agglutination (%)	23.3		35.5		61.5		80.0		67.4		54.3	

reactors which were detected by pullorin varied in the different flocks from 28.6 per cent to 62.5 per cent. The percentage of agglutination reactors detected by pullorin is apparently independent of the percentage of infection in the flocks. This variability is difficult to explain. The same condition was encountered by Graham and Tunnicliff.[5] The technic of the agglutination and intradermal tests was kept as nearly constant as possible. This variance in the percentage of agglutination reactors giving positive intradermal tests may possibly be due to the antigen employed in the intradermal injections. The physical properties of the product varied markedly; it is possible that the potency of the pullorin varied also. The same agglutination antigen was used in all the tests, so that the variability is not traceable to this factor.

Another serious discrepancy between the two tests is brought out in table I. This is the large number of birds reacting to the intradermal test which gave negative reactions to the agglutina-

tion test. Only 45.7 per cent of the birds which reacted to the pullorin tests were also positive to the agglutination test, while 83 birds, or 54.3 per cent, of the pullorin-positive fowls were negative to the agglutination test. From the postmortem examinations which we have made we are led to believe that a very large percentage of these birds which give positive intradermal tests and negative agglutination tests are not infected with *Bact. pullorum*, but that they are non-specific reactions. If this be true, the removal of such birds from breeding flocks would mean a serious loss to the poultryman. The possibility of these birds being carriers of *Bact. pullorum* will be discussed later.

Postmortem Examinations

On postmortem examination of the fowls, some abnormal conditions were found in the ovaries which were apparently not due to *Bact. pullorum* infection. While it is not our purpose to go into a detailed discussion of the pathology of the avian ovary in this paper, we wish to mention some of these conditions at this time. It is hoped that a more detailed report of this phase of the work may be presented in a later paper.

One of the most common abnormalities in the ovaries of hens which are negative to the agglutination test is the presence of cysts which result from the closing of the stigmal rupture in the calyx. Normally, when the ovary of a hen that has been laying intensively for some time is examined, numerous ruptured calices are found. These vary in size from a calyx large enough to hold an ovum, which is ready to be discharged, down to very small bodies the size of a pinhead. The larger sacs are those which have enclosed ova which have been very recently discharged; the smaller ones are apparently the calices of ova discharged some time before.

When the ovum is discharged into the oviduct the calyx is left as a ruptured sac, pendant from the ovary. Apparently when the physiological processes continue uninterruptedly, these calices degenerate and decrease in size until they are no longer noticeable upon macroscopic examination. At times, however, a pathological change takes place to interrupt this degenerative process. For some reason the rupture along the stigma of the calyx becomes closed and fluid is collected in the cavity. The fluid found in these cysts varies in color from a light yellow to a very dark, brownish red, probably depending upon the amount of blood present in the fluid. The result of such a condition might

TABLE II—*Postmortem examinations*

BAND NUMBER	PULLORIN TEST	AGGLUTINATION TEST	CULTURAL RESULTS*	MACROSCOPIC PATHOLOGY
2463	—	—	—	Hen in laying condition. Apparently normal
H229	—	—	—	Ovary apparently normal except for two transudation cysts
D76	+	—	—	Hen in laying condition. Ovary apparently normal
2460	+	—	—	Two transudation cysts
110	+	—	—	One blood clot and one transudation cyst
D80	+	—	—	Small ova only. Apparently normal
H228	+	—	—	Ovary apparently normal
46	+	—	—	Cyst on oviduct. One slightly angular ovum
H216	+	—	—	Ovary normal except for one transudation cyst
14	+	—	—	Ovary meaty, tumorous. Hen suffering with myeloid leukemia
H159	+	—	—	Several flabby ova, slightly discolored
H150	+	—	—	Three large flabby ova
H219	+	—	—	Small cyst on oviduct; transudation cysts
H87	+	—	—	Three transudation cysts in ovary
H72	+	—	—	Ovary apparently normal
H32	+	—	—	Two small ova discolored; one transudation cyst. Streptococcus recovered
H222	+	—	—	Two very small, slightly discolored bodies in ovary
H35	+	—	—	Ovary apparently normal
H246	+	—	—	Ovary apparently normal
2473	+	+	+	Practically all ova cystic, angular, discolored
152	+	+	+	Many angular, discolored ova
H223	+	+	+	One small, angular discolored ovum
H352	+	+	+	Several angular, discolored ova
H313	+	+	+	50% of ova discolored and angular. Cyst on oviduct

* +*Bact. pullorum* recovered. —*Bact. pullorum* not recovered.

TABLE II—*Postmortem examinations—Continued*

BAND NUMBER	PULLORIN TEST	AGGLUTINATION TEST	CULTURAL RESULTS	MACROSCOPIC PATHOLOGY
H582	—	+	+	Many angular, discolored ova
H579	—	+	+	Few very small angular, discolored ova
886*	—	+	+	Cockerel. Pericarditis, epicarditis, pericardial sac filled with pus
B396	—	+	+	Many angular discolored ova
H414	—	+	C	Several small, angular, discolored ova
987	—	+	+	Many ova, hard, discolored, angular
97	—	+	+	50% of ova angular and discolored
H175	—	+	+	Several very small, angular, discolored ova
18*	—	+	+	Pericarditis. Caseous exudate in pericardial sac. Angular, discolored ova
H136	—	+	+	One abnormal ovum. Vessels of membrane congested. Filled with thick, white fluid
H102	—	+	+	Many small, angular, discolored ova. Large ova apparently normal
H244	—	+	—	Several small ova, angular and discolored. Large ova apparently normal
127*	—	+	+	Necrotic areas on liver, hemorrhages on heart, ovary apparently normal
G15*	—	+	+	Cockerel. Slight pericarditis, cyst on brachial artery, cyst on vas deferens
104	—	+	+	Many angular, discolored ova
H257	—	+	+	Ovary very small. One cyst filled with purulent fluid. Large mass of organized exudate in peritoneal cavity. Concretion in oviduct

**Bact. pullorum* from pericardial fluid.
C = Contamination.

be called a retention cyst or a transudation cyst. Such names are not usually applied to cystic conditions of the ovary. Cysts occurring in the ovary are usually spoken of as follicular cysts or corpus luteum cysts. The condition described here is more or less analogous to the corpus luteum cysts of the higher animals. However, one hesitates to apply such a term to the avian ovary.

Gage[6] has mentioned retention cysts in the ovary of the fowl. While he does not define this term, it is not thought that he refers to the condition described here, but to degenerated ova. In order to avoid confusion of terms we will speak of these bodies as transudation cysts.

In the birds which were positive to the agglutination test and from which *Bact. pullorum* was recovered, diseased ova were usually found. These ova were similar to those described by Rettger,[7] in 1914, as ova harboring *Bact. pullorum*. In the postmortem reports these are described as diseased or cystic ova.

In table II the results of the postmortem examinations are given. In this table are included the reaction of the hen to the agglutination test, the reaction to the pullorin test, the recovery or non-recovery of *Bact. pullorum* on cultures, and a brief description of any pathological changes in the ovary and other internal organs.

The most significant fact brought out in table II is the high percentage of birds giving positive agglutination tests from which *Bact. pullorum* was recovered at autopsy. Twenty-one birds, giving positive agglutination tests, were cultured. *Bact. pullorum* was recovered from nineteen birds, the cultures from one bird were contaminated, and the cultures from one bird were negative. These figures are in close accord with those of Jones,[8] reported in 1913, who recovered *Bact. pullorum* from twenty of twenty-one birds giving positive agglutination tests. Sixteen of these birds from which *Bact. pullorum* was recovered had given negative pullorin tests.

Seventeen birds giving positive pullorin tests and negative agglutination tests were autopsied. In no instance was *Bact. pullorum* recovered from these birds. In one bird of this group (H32) a streptococcus was recovered from an abnormal ovum. We have found several cases in our work at this laboratory that yielded a streptococcus from ovaries which looked very much like *Bact. pullorum* ovaries. It is interesting to note that of nineteen hens giving negative agglutination tests and from which *Bact. pullorum* was not recovered, only seven possessed ovaries which showed no macroscopic pathological changes. Graham and Tunnicliff[5] report ovarian lesions in a large number of birds giving negative agglutination tests and from which *Bact. pullorum* could not be recovered. We believe that these pathological changes are not due to *Bact. pullorum* infection. A large number of the abnormalities found in birds of this class are the formations

which we have designated as transudation cysts. We have never recovered *Bact. pullorum* from one of these bodies.

While the birds giving negative agglutination tests and positive pullorin tests exhibit abnormal ovaries in many instances, the abnormalities are quite different from those found in birds giving positive agglutination tests. Transudation cysts and blood clots predominate in the birds giving positive intradermal and negative agglutination tests; angular discolored ova are found in the large majority of the birds giving positive agglutination tests. *Bact. pullorum* can be cultivated from these angular discolored ova in a high percentage of the cases.

From the results of the postmortem examinations it seems that the agglutination test is a much more accurate index of *Bact. pullorum* than is the pullorin test. Only 47.6 per cent of the birds reacting to the agglutination test reacted to the pullorin test. On the basis of the pullorin tests many infected birds would have been left in the flocks. On the other hand, 12.8 per cent of the total number of birds tested were positive to pullorin and negative to agglutination. On the basis of our postmortem examinations we feel that the large majority of these birds were not carriers of *Bact. pullorum*, but that the reactions in these birds were non-specific.

Conclusions

From the data presented it seems that the agglutination test is a much more reliable method of testing fowls for *Bact. pullorum* infection than the intradermal test employed in this study.

REFERENCES

[1]Ward, A. R. and Gallagher, B. A.: An intradermal test for *Bact. pullorum* infection in fowls U. S. Dept. Agr. Bul. 517 (1917).

[2]Scherago, M. and Benson, J. P.: Experiments on the intradermal test for *Bact. pullorum* Cornell Vet., ix (1919), pp. 111-117.

[3]Fuller, J. W.: The intradermal test for detecting fowls carrying *Bact. pullorum*. Rpt. N. Y. State Vet. Col. (1922-1923), pp. 59-61.

[4]Broerman, A.: Biological and medicinal agents for poultry. Jour. A. V. M. A., lxx (1927), n. s. 23 (5), pp. 597-604.

[5]Graham, R. and Tunnicliff, E. A.: Studies in the diagnosis of bacillary white diarrhea. Jour. A. V. M. A., lxx (1927), n. s. 23 (5), pp. 612-628.

[6]Gage, G. E., Paige, B. H. and Hyland, H. W.: On the diagnosis of infection with *Bact. pullorum* in the domestic fowl. Mass. Agr. Exp. Sta. Bul. 148 (1914).

[7]Rettger, L. F., Kirkpatrick, W. F. and Jones, R. E.: Bacillary white diarrhea in young chicks. (Fourth report.) Storrs Agr. Exp. Sta. Bul. 77 (1914).

[8]Jones, F. S.: The value of the macroscopic agglutination test in the detection of fowls that are harboring *Bact. pullorum*. Jour. Med. Res., xxvii (1913), pp. 481-495.

Servant (entering): "Prof. Goggles sends his compliments—and would you please shoot your dog, as he can't sleep."

Master: "Give my respects to the professor and tell him I shall be much obliged if he'll poison his daughter and burn the piano."—*Saturday Evening Post.*

AN IMPROVED ANTIGEN FOR THE AGGLUTINATION TEST IN BACILLARY WHITE DIARRHEA

By W. L. MALLMANN

Department of Bacteriology, Michigan State College
East Lansing, Mich.

One of the greatest obstacles to the use of the agglutination test for routine diagnosis of bacillary white diarrhea has been the so-called "cloudy" reaction. Serum, having an opalescent appearance when mixed with phenolized (0.5 per cent phenol) antigen, immediately or after a short incubation period, forms a heavy flocculent mass which generally gathers near the surface of the liquid. When a tube containing such an antigen-serum mixture is agitated, the flocculent mass breaks up into finely divided particles which give the contents a milky appearance. In such tubes, it is practically impossible to read the resulting agglutination.

Cloudy sera are frequently obtained from hens in production or shortly after feeding. Stafseth[1] reported that the food consumed by the birds has no relation to the serum produced. His work has been confirmed by other workers.

Hitchner[2] found that starving the birds for 24 to 48 hours, previous to bleeding, reduced the cloudy sera to a minimum. Stafseth[3] found that starving for 48 hours removed all cloudy reactions entirely. This plan of preventing cloudy sera has been employed extensively throughout the country but is objectionable because of its effect upon the flock. Flocks that are starved and bled are thrown out of production for a period of one to two weeks. Flock-owners have objected to the test for this reason and many of them would rather chance infection from white diarrhea than use the test in this form.

Mathews[4] reported that the material causing the cloudy precipitate is soluble in dilute NaOH but insoluble in dilute acid. He found that the addition of 2 cc of a 2 per cent aqueous solution of NaOH to each 100 cc of antigen, added immediately before using, eliminated 95 per cent of the cloudy reactions. Using *Bact. sanguinarium* as antigen, he found that the addition of alkali does not affect the resulting agglutination. He does,

Received for publication, July 7, 1927.

TABLE I.—*Effect of alkali on Bact. sanguinarium antigen in the presence of a positive serum*

AMOUNT OF N/1 NaOH TO 100 CC OF ANTIGEN (CC)	DILUTION											
	1–40	1–80	1–160	1–320	1–640	1–1280	1–2560	1–5120	1–10240	1–20480	CHECK	pH
1.0	++++	++++	++++	++++	++	+	—	—	—	—	—	10.5
2.0	++++	++++	++++	++++	++	+	—	—	—	—	—	10.6
3.0	++++	++++	++++	++++	++	+	—	—	—	—	—	11
4.0	+++	++	—	—	—	—	—	—	—	—	—	11.5
5.0	—	—	—	—	—	—	—	—	—	—	—	12
6.0	—	—	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—	—	—
8.0	—	—	—	—	—	—	—	—	—	—	—	—
Control	++++	++++	++++	++++	++++	++	—	—	—	—	—	—

however, suggest that the alkali-treated antigen be used only for cloudy sera.

Mathews' observations were made with the low dilutions of serum and, apparently, no attempt was made to determine the effect of the alkali quantitatively. No studies were made on the effect of alkali on *Bact. pullorum*. This paper presents a quantitative study of the effect of alkali on *Bact. sanguinarium* and *Bact. pullorum*.

Experimental

Immediately before using, varying amounts of alkali were added to phenolized antigen. Ten dilutions were used, namely: 1-40, 1-80, 1-160, 1-320, 1-640, 1-1280, 1-2560, 1-5120, 1-10,240, and 1-20,480. The method of procedure is described in a previous publication.[5] Readings were recorded after incubation for 24 hours at 37° C.

Results

Bact. sanguinarium antigen: This organism was obtained from Dr. F. P. Mathews, at Purdue University. The results of the test are recorded in table I.

It will be noted from observation of table I that the sensitivity of the *Bact. sanguinarium* antigen is lessened by the addition of even 1 cc of N/1 NaOH to 100 cc of antigen. When 4 cc of N/1 NaOH is added, a very marked reduction occurs and with 5 cc N/1 NaOH no agglutination takes place. Further additions appear to cause a dissolution of the cells, as indicated by the decreased turbidity.

Bact. pullorum (*Brahma*) *antigen:* This organism was isolated approximately before this experiment, from the ovaries of a Brahma hen. The results of the test with this organism, using the same serum as used with *Bact. sanguinarium*, are recorded in table II.

In the case of *Bact. pullorum* (Brahma) the addition of alkali caused an increase in the titre of the antigen instead of a decrease, as in the case of *Bact. sanguinarium*. The addition of 2 and 3 cc of N/1 NaOH to 100 cc of antigen gave a higher titre than the addition of 1 cc of N/1 NaOH or of the normal antigen. The addition of 4 cc of N/1 NaOH reduced the titre and the addition of 5 cc caused a complete loss of agglutination.

To check the results with *Bact. pullorum* (Brahma), two other strains of *Bact. pullorum* were selected for study. Strains 7 and 25, two stock strains that have been under study for over four

TABLE II.—*Effect of alkali on Bact. pullorum (Brahma) antigen in the presence of a positive serum*

AMOUNT OF N/1 NaOH TO 100 CC OF ANTIGEN (CC)	DILUTION											
	1–40	1–80	1–160	1–320	1–640	1–1280	1–2560	1–5120	1–10240	1–20480	CHECK	pH
1.0	++++	++++	++++	++++	++++	+++	++	—	—	—	—	10.5
2.0	++++	++++	++++	++++	++++	++++	++	+	—	—	—	10.6
3.0	++++	++++	++++	++++	++++	++++	++	+	—	—	—	11
4.0	++++	++++	++++	+++++	+++	+	+	—	—	—	—	11.5
5.0	—	—	—	—	—	—	—	—	—	—	—	12
6.0	—	—	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—	—	—
8.0	—	—	—	—	—	—	—	—	—	—	—	—
Control	++++	++++	++++	++++	+++	++	+	—	—	—	—	

TABLE III.—*Effect of alkali on Bact. pullorum (No. 7) antigen in the presence of a positive serum*

AMOUNT OF N/1 NaOH TO 100 CC OF ANTIGEN (CC)	DILUTION										
	1–40	1–80	1–160	1–320	1–640	1–1280	1–2560	1–5120	1–10240	1–20480	CHECK
1.0	++++	++++	++++	++++	++++	++	+	—	—	—	—
2.0	++++	++++	++++	++++	++++	+++	++	+	—	—	—
3.0	++++	++++	++++	++++	++++	++++	++	+	—	—	—
4.0	++++	++++	++++	++++	++++	++++	+	—	—	—	—
5.0	++++	++++	++++	++++	++++	++	—	—	—	—	—
Control	++++	++++	++++	++++	++++	++	—	—	—	—	—

TABLE IV.—*Effect of alkali on Bact. pullorum (No. 25) antigen in the presence of a positive serum*

AMOUNT OF N/1 NaOH TO 100 CC OF ANTIGEN (CC)	DILUTION										
	1–40	1–80	1–160	1–320	1–640	1–1280	1–2560	1–5120	1–10240	1–20480	CHECK
1.0	++++	++++	++++	++++	++++	+++	++	—	—	—	—
2.0	++++	++++	++++	++++	++++	++++	++	+	—	—	—
3.0	++++	++++	++++	++++	++++	++++	+++	++	—	—	—
4.0	++++	++++	++++	+++++	++++	++++	++	+	—	—	—
5.0	++++	++++	++++	++++	++++	+	—	—	—	—	—
Control	++++	++++	++++	++++	++++	+	—	—	—	—	—

years, were used. The results obtained with these two strains are given in tables III and IV.

The results obtained with *Bact. pullorum* strains 7 and 25 check with the results obtained with *Bact. pullorum* (Brahma), indicating that the property of increased titre with alkali is typical of various strains of *Bact. pullorum*.

Discussion

The results obtained indicate that when 1 cc of N/1 NaOH is added to 100 cc of *Bact. sanguinarium* antigen, a slight decrease in sensitivity of the antigen occurs. In the light of the experimental findings, the writer agrees with Mathews that when *Bact. sanguinarium* is used for antigen, the alkali should be added only to the antigen used for testing cloudy samples, due to the lowered sensitivity of the antigen. On the other hand, the addition of 1 to 4 cc of N/1 NaOH to 100 cc of *Bact. pullorum* antigen tends to increase the sensitivity of the antigen. In other words, the addition of this amount of alkali brings the antigen to its optimum condition, with the result that a better antigen is produced equally suitable for either cloudy or normal samples of blood.

Stafseth,[6] of the Michigan Station, has used this antigen for the past three months on routine tests. No cloudy reactions were obtained although a large number of cloudy samples were tested. In his hands, this antigen checked with the usual antigen used. Using the test suggested by Mathews, no such agreement was obtained, thus confirming the experimental results.

Summary

A *Bact. pullorum* antigen containing 1 cc of N/1 NaOH to 100 cc of antigen is recommended for the routine agglutination test for bacillary white diarrhea. This antigen is slightly more sensitive than the usual antigen and has the added advantage of entirely eliminating cloudy reactions. The starving of birds for forty-eight hours previous to bleeding is not necessary when this antigen is used.

References

[1]Stafseth, H. J.: Investigations of the agglutination test for *B. pullorum*. Mich. Sta. Rpt. (1924), p. 186.
[2]Hitchner, E. R.: The macroscopic agglutination test as influenced by fatty content of the blood serum. Jour. A. V. M. A., lxiii (1923), n. s. 16 (6), pp. 759-763.
[3]Stafseth, H. J.: Unpublished data.
[4]Mathews, F. P.: Obscured reaction in the agglutination test for bacillary white diarrhea. Jour. Immun., xi (1926), pp. 499-504.
[5]Mallman, W. L.: *Bact. pullorum* studies. Mich. Agr. Exp. Sta. Tech. Bul. 68 (1925).
[6]Stafseth, H. J.: Unpublished data.

THE POSSIBLE ROLE OF RADIANT THERAPY IN DEMODECTIC MANGE

By JOHN G. HARDENBERGH *and* CHARLES SHEARD

Division of Experimental Surgery and Pathology and Section on Physics
The Mayo Foundation, Rochester, Minnesota

Besides the large number of chemical and pharmaceutical agents that have been employed in antidemodectic therapy, ultraviolet and infra-red irradiations have been reported by a number of workers as producing beneficial and, in some instances, apparently curative action in cases of follicular mange and other skin diseases.[1,2,3,4] Most of the reports have been based on clinical data only. We have not seen any data relative to the effects of these physical agents on the demodectic parasites in vitro.

Recently, while observing the effects of ultraviolet irradiation on an advanced case of demodectic mange in a dog, we studied the effects of infra-red irradiation, ultraviolet irradiation and combinations of the two types of radiant energy on the viability of the demodectic parasites after removal of the mites from the patient's skin.

The subject was a pure-bred St. Bernard male, one year old, in which the disease had progressed for several weeks and to such an extent that much of the head and legs was devoid of hair. Areas of infestation were also distributed over the body from the head to the base of the tail. Secondary infection had already occurred with the formation of pustules, particularly about the nose and face and on the legs. Microscopic examination of skin-scrapings and of the material expressed from the pustules and from pores of the denuded skin revealed *Demodex folliculorum* var. *canis* in large numbers (figs. 1 and 2).

In studying the effects of the selected portions of radiant energy on the parasites in vitro, it was necessary to determine, first of all, a means of differentiating dead and living specimens of the parasite and, secondly, to determine whether the parasites would survive long enough in vitro to permit studies to be made. Both requirements were readily met. The demodectic mites which, in the ordinary coverslip preparations made from skin-

Received for publication, June 23, 1927.

scrapings or from material expressed from the hair follicles, are either only sluggishly motile or not motile at all at room temperature (20° to 25° C.), exhibit considerable sensitiveness to degrees of heat somewhat greater than that of the body. That is, parasites which exhibit no movement or only occasional movements of the head or legs at the temperature of the room, show active movements of the head, legs and sometimes the body when warmed to temperatures of from 40° to 45° C. This heating test, therefore, serves as a means of determining the

FIG. 1. *Demodex folliculorum* var. *canis* (x 60).

degree or intensity of the effects produced by various physical agents on the viability of the Demodex parasites.

GENERAL EXPERIMENTAL PROCEDURE

Drop-culture slides, each with cavity about 3 mm. deep, were used and cut to size for insertion in the warming-stage attached to the microscope. The depression was filled with a normal solution of sodium chlorid at a temperature of 25° C. except as noted elsewhere in this paper. Skin-scrapings from the dog (fig. 3) were obtained and placed on cover-slips. These slips were then inverted and sealed on the slide by means of gold

size, due care being taken to avoid the admission of air. In general, we made use of quartz cover-slips (0.5 mm. thick) for the reason that it was thus possible to irradiate the skin-scrapings with the water- or air-cooled mercury-quartz lamp. Prior to further experimentation, each slide was examined microscopically under 60 to 100 diameters to see that at least two or three Demodex were living and were sufficiently separated from the mass of other material to insure the accuracy of subsequent

FIG. 2. *Demodex folliculorum* var. *canis* (x 200).

observation. After repeated trial it was found that these parasites remained alive for at least forty-eight hours in normal solution of sodium chlorid or in distilled water at a temperature of approximately 25° C.

THE EFFECTS OF HEAT

Four different sets of experiments, conducted during the period of a week, were carried out to determine the effects of heat, as furnished by the warming stage, on the activity and

life of the mites. In general, each set of experiments occupied from one hour to two hours. At a temperature of 31° to 35° C. (approximately the skin temperature of the dog) the movements of the parasites became fairly marked, at 40° C. more noticeable and at 45° C. very active, with subsequent cessation of movement and death in about five minutes at a temperature of about 54° C. The various experiments on the lethal tem-

FIG. 3. Dog from which skin scrapings, containing *Demodex folliculorun*, were obtained.

peratures gave values of 54.5° C., 53° C., 54° C. and 54.5° C. We conclude, therefore, that heat at a temperature of 54° C. $\pm 1°$, applied for a period of from five to ten minutes, is lethal to the *Demodex folliculorum*.

Two experiments were conducted in which the chamber of the

culture-slide was filled with 1:1000 solution of mercurochrome. With progressive rise of temperature in the warming-stage, it was noted that the mites became very active at 45° C., began to lose motility at 53.5° C. and were dead after five minutes of heating at 54.5° C. Stronger solutions of mercurochrome were not used or investigated because of inability to make microscopic observations under the technic adopted. It is evident that weak solutions of mercurochrome have no effect in hastening the death of the parasites or of causing them to die at a temperature lower than 54° C.

The Effects of Ultraviolet Irradiation

Three sets of experiments were carried out on different days with skin-scrapings smeared on quartz cover-slips which were then inverted and sealed to the culture-slides, the cells of which were filled with physiologic solution of sodium chlorid. All slides were examined after preparation to see that at least two mites were alive. In order to determine this, each slide was inserted in turn into the warming-stage kept at a temperature of about 40° C. which we had found was a sufficiently high temperature to demonstrate definite activity of living parasites.

Eight quartz cover-slips were smeared with skin-scrapings, inverted and sealed to the culture-slides. All slides showed the presence of several mites. The slides were then irradiated with an air-cooled mercury-quartz lamp* (giving a grade 1 reaction or transient erythema of the normally unexposed skin of the upper arm in three minutes when operated at 70 volts at a distance of 50 cm., and a grade 2 reaction or lasting erythema in six minutes) at 90 volts and a distance of 50 cm. The data obtained from these eight slides are given in table I.

These and similar sets of data we believe clearly indicate that the initial action of ultraviolet irradiation by the quartz-mercury arc is stimulative. Irradiation lasting from one minute to possibly ten minutes does not appear to be lethal to the parasites as observed for forty-eight hours. On the contrary, they appear to be much more active at 25° C. (the control temperature of the experiments) after such periods of irradiation than they would be normally at the same temperature. Irradiation at 90 volts and at a distance of 50 cm. for from fifteen to thirty minutes produces lethal effects at the end of twenty-four hours in some instances, and general destruction of all directly irradiated para-

*Made available through the courtesy of the Victor X-Ray Corporation.

sites follows within forty-eight hours after such initial periods of irradiation. Objection may be raised that death might be expected to occur in a long enough interval after removal of the parasites from the host. The different controls, treated in every respect the same as other slides except for the ultraviolet irradiation, showed that death had not occurred from natural causes in forty-eight hours. No definite morphologic changes could be demonstrated in the Demodex treated with the radiations from the quartz-mercury lamp, although there was some evidence of coagulation of surface tissues in a few instances.

TABLE I.—*The effects of various periods of irradiation by an air-cooled quartz-mercury vapor lamp (operated at 90 volts at a distance of 50 cm.) on the subsequent life of the mite Demodex folliculorum*

SLIDE	PERIOD OF IRRADIATION (MINUTES)	MICROSCOPIC EXAMINATION		
		IMMEDIATELY AFTER IRRADIATION	TWENTY-FOUR HOURS AFTER IRRADIATION	FORTY-EIGHT HOURS AFTER IRRADIATION
1	2	All active	Quite active	Two slightly active
2	4	All active	Quite active	Three slightly active
3	6	Few slightly active	Quite active	Three or four slightly active
4	10	Several active	Quite active	Apparently inactive
5	20	Several active	Only two active	Apparently inactive
6	30	Several active	Three or four slightly active	Apparently inactive. Only active ones were protected by debris. All that had been fully exposed to ultraviolet rays were dead
7	Control	Several active	Several active	Several active
8	Control	Many active	Many active, some sluggish	Many active; estimated 70 per cent of original number are living

THE EFFECTS OF COMBINED ULTRAVIOLET AND INFRA-RED (HEAT) IRRADIATION

There is considerable evidence to show that after irradiation with ultraviolet rays coagulation of egg-albumin and serum-albumin will take place at temperatures below those at which it normally occurs. And again, Bovie, in 1918, found that paramecia exposed to a sublethal dose of ultraviolet irradiation are so sensitized to heat that they cannot withstand a temperature which is optimal for controls. With these data in mind, therefore, it seemed desirable to determine, if possible, the

temperatures at which death occurred in those parasites which had been irradiated for various periods with ultraviolet light.

In one set of experiments, five slides were prepared; one served as a control while the other four were irradiated five, fifteen, twenty-five and thirty minutes, respectively, with the quartz-mercury lamp operating at 90 volts and at a distance of 50 cm. Each slide was then inserted, in turn, into the warming-stage and the lethal temperatures determined in each case. The data are shown in table II.

TABLE II.—*The effects of various periods of ultraviolet irradiation of the parasites by an air-cooled quartz-mercury arc lamp (operated at 90 volts at a distance of 50 cm.) on the temperatures which are lethal to Demodex folliculorum*

SLIDE	PERIOD OF IRRADIATION (MINUTES)	LETHAL TEMPERATURE (DEGREES C.)	REMARKS
1	Control	52.8	Inserted in warming-stage at 34.5°C. Time in warming-stage from insertion to lethal effects, 15 minutes. In some instances, movements ceased at 51°C.
2	5	53	Time in warming-stage, 10 minutes. Inserted in warming-stage at 40°C.
3	15	50	Inserted in warming-stage at 39°C. Time in warming-stage, fourteen minutes
4	25	47	Inserted in warming-stage at 36°C. Time in warming-stage, eleven minutes*
5	30	44.5	Inserted in warming-stage at 35°C. Time in warming-stage, thirteen minutes†

*When the temperature of the warming-stage was 48° C. another mite made its appearance in the field of view, crawling out from under the protecting debris. From all appearances, this Demodex was dead at a temperature of 49° C.

†At a temperature of 46° C., several living parasites came into the field of view, crawling from under the protecting debris. Lethal temperatures in these cases (48° to 51° C.) indicated that they had not been directly irradiated.

The experimental procedure previously described was modified in another set of experiments by the insertion of a properly prepared slide (with quartz cover-slip holding fifteen or more living mites) into the warming-stage ultimately kept at a temperature of 42° and 45° C. Irradiation was carried on through the barrel of the microscope for five minutes by the quartz-mercury vapor lamp operating at 90 volts at a distance of 50 cm. After irradiation, the slide was examined microscopically. About a third of the parasites appeared to be dead and a few were sluggish but approximately half of the total number were quite active. The slide was then subjected to additional irradiation for ten minutes, after which all parasites were believed to be dead. The temperature at the conclusion of the observations

was 44° C.; the total time involved in the experiment was thirty-five minutes. A second slide, carrying an approximately equal number of mites and which served as a control, was then inserted into the warming-chamber at 44° C. At the end of two hours, all parasites were found to be alive and very active. The following day (after being kept over night at a temperature of approximately 25° C.) the slide was examined at a temperature of 41° C. and apparently all the mites were alive.

From these and similar observations we believe we are justified in concluding that irradiation of *Demodex folliculorum* with ultraviolet light causes death at temperatures below those at which death takes place normally. The greater the amount of irradiation the lower the temperature at which death occurs. If the data given in table II are plotted on coördinate paper, the relationship between the duration of irradiation and the lethal temperatures in degrees Centigrade will be found to be very nearly a linear one; it will also be evident that irradiation for one minute causes a reduction of approximately one-third of a degree in the lethal temperature. This statement is to be understood as indicating the order of effect only, because it is doubtless true that the first minute or two of irradiation produces little effect and that periods of irradiation exceeding thirty minutes could not cause a proportionate reduction in the value of the lethal temperature.

Furthermore, it would appear that simultaneous treatment with ultraviolet irradiation (that is, all irradiation from an air-cooled quartz-mercury arc lamp) and heating at a temperature at which the mites are very active (about 45° C.) produces lethal effects more readily than does the experimental condition in which irradiation with ultraviolet light precedes (by periods varying from one hour to twelve hours) the application of heat as derived from either a warming-stage or the irradiation from a source particularly rich in infra-red energy.

The Therapeutic Effects of Ultraviolet Irradiation in Cases of Demodectic Mange

Without going into detail, the results obtained in treating cases of demodectic mange in dogs may be stated briefly. The animal from which the material for these experiments was obtained represented an extremely advanced case in which the usual forms of treatment almost certainly would be without effect. Accordingly, the dog, after being clipped, was irradiated

daily for fifteen to forty-five minutes with an air-cooled quartz-mercury arc lamp operated at 90 volts at a distance of about 50 cm. No other form of treatment was applied except an occasional cleansing of those areas in which marked secondary infection had occurred. The irradiation was continued for several weeks; during this time the animal's general condition improved markedly but there was no pronounced therapeutic effect on the areas infested with Demodex mites and cure was not brought about.

Two cases of demodectic mange in fox terrier puppies have responded to treatment following similar radiation. These cases were mild and were completely arrested with comparatively few treatments. The possibility of spontaneous arrest of the infestation in these cases is recognized but such termination in our experience is not a likely factor.

Discussion

The idea seems to be increasingly prevalent that the presence of the hair-follicle mites is a result and not a cause and that such factors as predisposition, degeneracy in breeding, general lack of vitality, or debilitating conditions such as distemper may be the inciting mechanisms which render an animal vulnerable to the invasion of Demodex which so often results in secondary infection, auto-intoxication, cachexia and final exhaustion. Whatever may be the true significance of the various factors, the diagnosis of demodectic infestation in the dog usually must be regarded seriously, and therapeutic measures must be directed to the elimination of the parasites and to the maintenance or improvement of the general health of the host.

From the results of our experiments, it seems probable that the benefits of ultraviolet irradiation in cases of demodectic mange cannot be due to any specific lethal effects on the parasites, imbedded and protected as they are in the deeper layers of the skin. The action is apparently stimulative in nature and tends to maintain and improve the general physical tone of the animal and thus help it to overcome the usual effects of the invading parasites. The results also indicate that *Demodex folliculorum* is more susceptible to heat (infra-red) than to other forms of radiant energy. Further experimentation is indicated to determine whether a degree of heat can be found which is not objectionable to the patient and non-injurious

and which, if continued long enough, will still have a lethal effect on the imbedded parasites.

The chief value of the experiments reported here does not lie in their therapeutic application but in the demonstrated lethal effects of the different types of radiant energy on *Demodex folliculorum* in vitro and the apparently limited lethal effects which these forms of energy can be expected to have, under present methods of application, on parasites in vivo.

Conclusions

1. At about 40° C. the movements of *Demodex folliculorum* become fairly marked under the microscope and at 45° C. marked and active. This furnishes a simple criterion by which living Demodex may be selected from dead Demodex.

2. A temperature of 54° C. $\pm$ 1°, obtained either by ordinary heating methods or from infra-red irradiation, applied for a period of from five to ten minutes, is lethal to Demodex.

3. Weak solutions of mercurochrome have no apparent effect in hastening the death of the parasites or of causing them to die at a temperature lower than 54° C. $\pm$ 1°.

4. Immediately after irradiation with the ultraviolet lamp for from two to twenty minutes, there is increased activity of Demodex kept under the initial control temperature of 25° C.

5. Irradiation for from fifteen to thirty minutes by the energy from a quartz-mercury arc lamp (operated at 90 volts, at a distance of 50 cm.) produces lethal effects in some instances at the end of twenty-four hours at the control temperature of 25° C., and general destruction of all directly irradiated parasites follows within forty-eight hours after such initial periods of irradiation.

6. Irradiation of the parasites with ultraviolet light, followed by dry heat or infra-red irradiation, causes lethal effects at temperatures considerably below those at which death takes place normally.

7. Simultaneous irradiation with ultraviolet light (from a quartz-mercury vapor lamp) and infra-red (heat) energy produces lethal effects more rapidly than does the consecutive application of these two types of irradiation.

8. The daily irradiation of an animal affected with demodectic mange for from fifteen to forty-five minutes with an air-cooled quartz-mercury arc lamp, operated at 90 volts at a distance of 50 cm., apparently maintains the general physical tone

of the whole animal at a higher level and thereby aids in combating the untoward conditions set up in the host by the invading parasites.

REFERENCES

[1]Marotel and Pierron: Traitement de la gale démodécique canine par les rayons ultra-violets. Rev. Veter., lxxviii (1926), pp. 350-358.
[2]Patton, J. W.: Ultraviolet radiation as a therapeutic agent in veterinary medicine. Jour. A. V. M. A., lxix (1926), n. s. 22 (6), pp. 734-758.
[3]Frick, E. J. and Bullard, J. F.: Ultraviolet light in veterinary medicine. Jour. A. V. M. A., lxvii (1925), n. s. 20 (4), pp. 515-521.
[4]Springer, M. and Tardien, A.: (Action of ultraviolet rays on growth). Bul. Acad. de Med., xcv (1926), pp. 394-398.

CUBAN ARMY OFFICERS RESIGN

Because of orders issued by the General Staff of the Cuban Army, prohibiting officers from belonging to mutual aid associations, the veterinary officers belonging to the National Veterinary Association of Cuba have tendered their resignations as members of that association.

The resignations were laid on the table, and a committee appointed to interview the Chief of Staff of the Cuban Army to see if some arrangement could be reached by which the veterinary officers could retain their membership in the National Veterinary Association.

N. S. M.

See Philadelphia—September 13-14-15-16.
Rich in History; active in Industry;
Renowned in Medical Science

TWO SERIOUS QUESTIONS

A writer in the Marengo (Illinois) *Republican News* states that two things seem to be pretty prominent in the minds of the writers in the agricultural press today. He states that these are: "How Can the Government Help the Farm Situation," and "The Thinning of the Ranks of the Veterinarians." In commenting upon the latter question, the writer goes on to say:

> We have noted for years that governmental activities, including the county agents' work, have gradually been encroaching upon that of the veterinarians and then too the motor vehicles have displaced practically all of the driving horses and in some cases even the mules on the farm, leaving for the veterinarian only the cows of the country.
>
> Right now the biggest end of veterinary practice is swine and chicken industry and the government and the states are doing most of the work for the farmer with these two classes and in the big cities some veterinarians have developed an animal practice and do quite a business on pet dogs, cats, birds and other such animals, but this field is limited and the country veterinarian in most sections of the United States has a pretty hard proposition of making things go.

IS THERE A DIPTERON IN THE OINTMENT?*

By WARD GILTNER, *East Lansing, Mich.*

Dean, Division of Veterinary Science, Michigan State College

An ointment is a very old-fashioned therapeutic agent for the cure or alleviation of certain types of ailments. In spite of its ancient character, and like many other useful devices, it will never be out of date and will always be subject to changes, improvements and innovations, both in respect to its composition and the methods of its application. Sometimes an ointment becomes the unfortunate recipient of foreign, extraneous matter, including living creatures, such as the diptera—hence the old saying about the "fly in the ointment."

Tuberculosis is a serious ailment, particularly of man and of at least three vitally important domesticated animals, viz., cattle, swine and poultry. It, like ointments, has a noble lineage and is not a modern invention of the devil or an imaginary evil created on paper and in speeches to frighten rustics or gullible urbanites.

Tuberculosis ranks as one of the great universal enemies of mankind. It is a human trait, not universally shared by man, to fight enemies. Perhaps nowhere and at no time in history have certain diseases been more vigorously, more intelligently and more successfully combated than in the United States during the past two generations. The vigor of the attack is characterized as distinctly American, the intelligence is merely a matter of utilization of existing but recently acquired knowledge of the nature of communicable disease, and the success must be attributed to the policies and the personnel of the federal and state live stock sanitary authorities, who have had the rare opportunity to work with a sufficiently submissive—intelligently submissive—and cooperative public.

Our knowledge of tuberculosis is not complete by any means but it has accumulated to such an extent that for a generation there have been those bold enough to advocate a concerted plan of eradication. The speaker asks permission to be numbered in that group. The ointment finally selected for application to this affliction—the area plan—meets with his qualified approval.

*Read before the Lake States Tuberculosis Eradication Conference, Lansing, Mich., June 27-28, 1927.

It is his privilege to inquire, at this stage in the application of the remedy, whether there may not be flies in the ointment. The inquiry is, therefore, sympathetic and critical, but not destructively critical. There are those, who have a right to express themselves because of their training and experience or because of their personal interests at stake, that see or think they see these offensive diptera. It is our duty carefully and without undue prejudice thoroughly to examine the ointment.

The area plan of bovine tuberculosis eradication, if I am correctly informed, is not in a strict sense imposed upon any area. The areas involved voluntarily and democratically elect to submit to the cooperative machinery of eradication. The explanation for this submission to the imposition of a temporary and more or less apparent or real hardship are: (1) Bovine tuberculosis is a destructive plague of cattle and swine. (2) It is communicable to man, especially to infants, by way of milk. (3) The tuberculosis situation in the United States and with respect to our available weapons of combat warrants the drastic measures of the plan.

The Situation

As the speaker sees it, the situation in the United States is as follows: (1) Vast areas into which tuberculosis has been introduced and where it constitutes a menace to live stock and human health, but where it has gained very little headway; and more limited areas, but very important with respect to their live stock and human population, where the disease is rapidly approaching a status as alarming as that which confronts the British Isles and parts of Western Europe. (2) A people who boast of their independence and individualism—who have occupied from ocean to ocean the most favorable single agricultural area on the face of the earth and called it the "land of the free and the home of the brave," but who, most paradoxically, surrender their individuality and freedom of action with an abandon that baffles the psychologist.

The examination of the ointment should be as painstaking as have been the procedures in its manufacture. Some of the dipteral masses may be only imaginary—in the eye of the critic and not in the ointment; some may be tiny black specks that should not and need not be tolerated, but are not of serious consequence; some may be real flies. Again there may be

swarms of flies about the ointment-pot, threatening to get in and generally causing irritation.

The speaker does not pretend to have made or to be qualified to make an exhaustive study of the subject, but he will examine a few from the accumulating collection.

(*1*) *Is tuberculosis transmissible to man?* Yes; but there are a great many more serious problems of human health than is bovine tuberculosis and the pasteurization of milk can be made, even on the farm itself, an adequate protection against this danger. It is a serious mistake either to deny the danger or to magnify its importance.

(*2*) *Is tuberculosis of live stock curable?* Certainly not by means of any known remedy and not by Nature so successfully that any dependence can be placed upon it.

(*3*) *Is it preventable?* There is no known, proved and reliable specific preventive treatment. A vaccine such as BCG may, in time, find a place in tuberculosis control. Studies along this and related lines should meet with hearty support and should not be impeded by any accepted plan of eradication, but hopes for their success should not stand in the way of pushing the area plan.

(*4*) *Is it possible to test cattle, swine and poultry for tuberculosis and pick out all the affected animals and none of the non-infected?* No. The methods employed are, especially when applied to cattle, remarkably effective under ideal conditions but they are not always applied under such conditions and they fail in a variable percentage of cases. This is a real, entomological specimen in far too many packages of the ointment.

(*5*) *Is it possible to perfect the technic of the plan?* No. As in all biological work of this character, where it is necessary to sacrifice only the affected animals, it is not possible to get perfect results; but, by improving the personnel and the technic, the results can be made so satisfactory that the method will be the more easily justified.

(*6*) *Will the eradication of bovine tuberculosis incidentally mean the eradication of swine tubrculosis?* Apparently not.

(*7*) *Will the eradication of tuberculosis from cattle only result in its permanent disappearance from cattle?* No one knows. Avian tuberculosis has been produced in cattle. It is not known what effect avian and mammalian tuberculosis other than bovine might have on tuberculosis-free cattle over a long period of time

(*8*) *Are not owners of live stock and the general public led to the view that the success of the area plan means more to them than the facts warrant?* There is grave danger in the possibility of this resulting. As already pointed out, the success of the plan can be only relative. The absolute removal, from a great many areas, of all affected cattle and of all tubercle bacilli that may gain access to cattle and infect them, should not be expected. The eradication of the disease from the entire United States is much less to be expected. So long as there are sources of infection on earth, there is danger to the small, comparatively free areas. Those that pin their faith to the area plan must expect to adhere to a policy of eternal and unceasing vigilance. Furthermore, there is reason to believe that the very excess of ardor and energy which necessarily characterizes the area plan has already and will continue so to preoccupy the minds of those involved that there may result a neglect of other very, equally, or even more serious human and animal disease problems.

(*9*) *Has not the area plan tended toward a weakening of the fabric of veterinary pedagogy, science and practice?* There are conflicting replies to this inquiry. Many men in various fields of veterinary activity and with varying degrees of soundness of judgment have expressed themselves as satisfied that the area plan has stimulated interest in veterinary education and practice. It is obvious that it has created many full- and part-time positions for recent veterinary graduates and older veterinarians who have been easily detached from their previous occupations. It has also in many cases stimulated private testing of cattle to the advantage of the local practitioner. But it appears to the speaker that there has been and still is a larger, but at present quieter and not increasing, group the members of which have, for various reasons, taken pains mildly to criticise or roundly to denounce the area plan as a menace to all things veterinary, except the building-up of a vast bureaucracy. The eradication or even the attempted eradication of a great animal plague must be and will be undertaken by an energetic and intelligent public when it becomes widely known that scientific information and practical means are available and when economic considerations demand such an effort. The same intelligence that pushes such a campaign into its early years of success should be equal to the task of appraising its effect on the whole program of disease control and eradication.

Not Enough Disease Investigation

The speaker very boldly affirms that relatively too much attention has been paid in the United States to efforts to eradicate certain infectious diseases of the domesticated animals and far too little attention has been paid by the federal or state governments and by private or quasi-public interests to the scientific investigation of animal diseases in general, to the thorough education of young men in veterinary science and practice, and to the encouragement of the upbuilding of a veterinary profession that is competent and ready to cope with veterinary problems as a whole. What will it profit animal industry if a more or less successful attempt is made to eradicate tuberculosis from the cattle of the United States, if this industry is to be left without adequate protection against a long list of other enemies, some of which may be already even more of a menace than is tuberculosis? What will it profit the public at large if an overwhelming political pressure is brought to bear against one animal disease that is communicable to man, while many others, perhaps equally menacing, are practically ignored? There can be no question about the desirability of a well-balanced veterinary program for the United States. If the area plan is a menace to the development of such a program, its favorable results in the suppression of one disease are secured at a tremendous price—a price that no people can afford to pay. To some observers this thing looks very much like a fly—the tsetse fly—in the ointment. Beware of the fly of sleeping sickness.

We have examined the ointment as carefully as time permits. We have found that it is a good ointment; that it works well in many areas of the United States, but not perfectly; that the disease to which it is applied needs attention; and that no other remedy has proved effective. Have we found any flies in the ointment? There certainly were some strange-looking objects—quite a number of them—hovering about the pot, on the surface, and down in the depths, even at the bottom of the ointment-jar. Our training in systematic entomology may not be adequate to permit us positively to identify any of these objects as diptera, but some of them are damned suspicious and we beseech you, who have the best interests of this work at heart, to examine these dark objects further. And above all, if there are those of you who have this work closer to your heart than the interests of the whole live stock industry and of public health in general,

take heed lest you fall and be buried in the ruins of the plan itself; for just as surely as this plan is played up beyond its true value and out of proportion to its relative importance, just so sure will it crash down about the heads of those that promote it.

Betsy Ross House, Philadelphia.

HANDLING AND DISPOSING OF REACTOR CATTLE*

By E. P. SCHAFFTER, *Inspector-in-Charge,*
U. S. Bureau of Animal Industry, Detroit, Mich.

SUPERVISION OF HANDLING OF REACTORS IN STOCKYARDS

Our supervision of the handling of reactors begins in the stockyards; in fact it begins in the cars before the animals are unloaded, and continues until the final postmortem inspection is completed and the carcasses are either tanked, passed for sterilization or passed without restriction. It is the duty of the inspector to ascertain that animals are handled by the transportation companies in conformity with the requirements of the state regulations which provide for the segregation of reactors if shipped with other cattle; also that the waybills bear a notation that the shipment consists in part or wholly of reactor animals. All cars containing reactor animals are placarded by the inspector, and the proper officials of the transportation company are informed by telephone and letter that said cars contain tuberculous animals and are required to be cleaned and disinfected under the supervision of an employe of the Bureau.

When cattle are unloaded, they are driven directly to pens set aside to yard tuberculous animals and are held in these pens until sold for slaughter. When the cattle are driven to the scales, they are run through holding-chutes, in order that the appraiser, who is a state official, may secure the numbers of the ear-tags and the description of the animals. This record is checked against the report he receives from the owner and he also makes a re-check against these two records upon the receipt of a copy of Form 112-F, postmortem report. From these records he makes his final report, which is forwarded to the Lansing office.

After the cattle are weighed, they are returned to the quarantine pens, where they are held until loaded out for shipment to official establishments or others having a permit to slaughter such animals.

ANTEMORTEM INSPECTION

All animals are required to be subjected to an antemortem examination and inspection before they are allowed to be slaughtered. Therefore, animals received at an official establishment

*Read before the Lake States Tuberculosis Eradication Conference, Lansing, Mich., June 27-28, 1927.

which are known to have reacted to the tuberculin test are inspected in the same manner as are the regular run of animals offered for slaughter. All animals known to have reacted to the tuberculin test are required to be treated as suspects. The inspector in his examination of these animals must carefully observe that the animals are properly marked and any animal bearing no reactor tag which shows a burning brand with the letter "T" on the jaw must be marked with a suspect tag. Such animals are kept separate and apart in the pens on the premises of the establishment and are slaughtered separately from other cattle.

Postmortem Inspection

Equipment: To discuss fully a paper of this kind, there should be no omissions by reference to any phase of the subject, as each and every step of the work is governed by regulations which restrict every operation of the work and conditions under which the work is performed, to insure cleanliness and sanitation throughout; that is, the structure of the department must conform to certain specifications. Ample light must be provided; character of the equipment must be of such material and construction that it can be readily maintained in a sanitary condition. Lavatories must be provided, also equipment for the sterilization of implements, trucks, head-racks, etc.

Knowing you are all fully familiar with the regulations governing this subject, I do not think it necessary to enter into a detailed discussion of the matter, nor will reference be made, excepting in a brief way, from time to time, to the preparation of carcasses and parts for inspection, as this is a function of the employes of the establishment.

Inspectors: The demands on the veterinary inspector who is engaged in postmortem inspections are very exacting. For the efficient conduct of this work he must have considerable experience and training. He must possess a sound knowledge of the subject; must be minutely exact, and his work complete in every detail. He must develop the faculty of keen observation. Every detail of technic must be observed and must be systematic. An inspector is not long in acquiring these qualifications, providing he can be made to develop a real live interest in his work.

To illustrate what is meant by the training and care needed for efficient postmortem examination is mentioned the fact that, for an inspector to assure himself that no visible lesions are to be

found, he cannot permit any part of the animals to escape scrutiny, as it is possible to discover isolated lesions in nearly every tissue of the animal. Such lesions have been found in the lacteal ducts; frequently in the skin; occasionally in the spinal column, joints, synovial membranes, suprarenal capsule, remote skeletal lymph-glands and skeletal musculature. Furthermore, slight lesions may be found in visceral organs without the lymph-glands common to these organs showing involvement.

Tagging: Preliminary to the postmortem examination of reacting animals, a system of marking the carcasses and parts for their positive identification until the postmortem inspection is completed is highly essential. The mere use of a five-section tag has been found to be inadequate, due to frequent errors by transposing figures and misapplication of tags. The system we are using is as follows:

The first incision made in the carcass after bleeding is the removal of the head. This primal part is then transferred to a specially constructed metal rack consisting of a series of individual units. The head is placed in one of these units and the first section of a retain tag is applied. On this tag is written the reactor tag number. The reactor tag remains in the ear in its original position. The carcass is then dropped to the floor for the removal of the feet and hide by the floorman. When the hide is removed from the sternum, a section of the same series of tags, also bearing the reactor tag number, is attached to each half of the sternum. At this point in the operation of dressing the carcass, the reactor tag is removed from the ear and transferred to the carcass. One section of the tag is applied to the udder upon its removal and the remaining tag is attached to the viscera. Other parts such as caul, thymus gland and tail are not separated from their natural attachments until the postmortem examination is completed. All tags above referred to remain attached to the carcass and parts until the veterinarian who is charged with the duty of recording tag numbers, lesions and final disposition of the carcass and parts removes them. This system of marking carcasses and parts for identification is to be recommended, as we believe it proof against any possible chance of error.

Operative Technic Generally Observed in Search for Lesions of Tuberculosis

Head and tongue: The first operation after bleeding the animal is the removal of the head. The head is then transferred to one

of the units of a head-rack which is provided with a hook. The head is then suspended from this hook by attachment at the apex of the lower jaw. This position of the head permits of a thorough cleansing of nasal and oral cavities and also the pharynx The head, after washing, is then placed in a position in the unit where the branches of the hyoid bones are severed and the tongue is partially extirpated, permitting its suspension near its tip where it hangs until inspection is completed. The removal of the tongue in this manner is to expose the inner masseter muscles for incising and examination for cysticercus.

Submaxillary glands: The first glands inspected are the submaxillary groups. These glands normally are located in a very superficial position in the inferior maxillary space between the inner aspect of the ramus of the mandible and the submaxillary salivary gland and only about two inches from the posterior curvature of the lower jaw. But these glands are not inspected in this position, they are inspected with the tongue suspended. The inspector provides himself with a hook which is used in drawing taut the tissue adjacent to the gland, usually the salivary gland, which exposes the lymph-gland and allows for repeated incisions and careful examination.

Post-pharyngeal glands: The post-pharyngeal glands are next examined. They are large and well exposed, requiring no particular technic to expose them for examination. These glands, when the tongue is in its normal attachment, are located above the pharynx and at the base of the brain and on either side of the median line between the branches of the hyoid bone. Following the inspection of these glands, the inspector makes a longitudinal incision through the external masseter muscle, extending the incision to the parotid lymph and salivary glands. This lymph-gland is partially imbedded in the salivary gland. This manner of approaching and exposing it to view for examination is very satisfactory. The inspection of these three groups of glands usually terminates the inspection of the head, as far as the inspection for tuberculosis is concerned, but the inspector has not completed his work until he has palpated and examined the tongue and inspected the bones, etc.

Skin: By the time the inspector has completed his work on the head, the floorman has partially skinned the legs, removing the phalanges. The skin of these regions is then examined for evidence of tuberculosis. It is in these regions of the hide in which lesions are most frequently found. No further examination

of the hide is made unless no lesions are found elsewhere, in which case the hide is spread out and gone over thoroughly. One of the operations of the floorman, after removal of the feet and removing the hide from the region of the median line, is the complete extirpation of the mammary gland and the lymphatic glands common to this organ.

Udder: The supramammary lymph-glands are situated bilaterally at the postero-superior part of the udder; they are very large and easily examined. These glands are carefully and repeatedly incised, as occasionally lesions are found here when no other lesions appear in the carcass. A number of incisions must also be made in the udder, as lesions simulating those of tuberculosis are sometimes found where the lymph-glands manifest no macroscopical evidence of infection.

Inspection of the Viscera

From this point we proceed to the inspection of the viscera. In some of the smaller houses, where but a few animals are slaughtered per hour, we begin the inspection of the carcass on the half-hoist, that is, the glands of the posterior portion of the carcass are examined while the carcass is in this position. Ordinarily the inspection of the carcass and skeletal lymph-glands is not made until inspection of the viscera is completed.

Bronchial glands: After the carcass is rumped it is hoisted to a perpendicular position when different parts of the alimentary tract are ligated, to prevent contamination when they are separated from their natural attachments. The carcass has been raised to a sufficient height to permit the introduction of a specially constructed truck between the fore legs and under the carcass for the reception of the viscera. This truck has two compartments; in one are placed the abdominal viscera, excepting the liver, and on the tray are placed the heart, lungs and liver. The intestines are then transferred from the truck to a stationary table. The inspection of the viscera begins with the left bronchial gland. This gland is located anterior to the left bronchus, near the trachea. In well-nourished animals it is imbedded in considerable fatty tissue. By grasping the left cephalic lobe of the lung firmly and drawing it taut, then cutting boldly into the area between this lobe and the trachea, the gland is easily exposed for incising and examination.

The right anterior bronchial lymph-gland is next incised. This gland is located on the right of the trachea near the bronchus of

the right cephalic lobe. It is usually well exposed, therefore, easily incised and examined. The right posterior bronchial gland occupies a more hidden position. This gland is located under the bronchus of the main lobe of the lung near its junction with the trachea. The gland is usually exposed by the inspector by grasping firmly the trachea with the left hand and making a bold incision through the bronchi to the position occupied by the gland.

The expeditious manner in which the inspector is required to perform this work, in order not to hinder seriously the operations of the establishment, is the reason for adopting certain methods for exposing some of these groups of lymphatic glands for incising and examination, which are not strictly in accordance with methods recommended by some of the authors of our text-books. The inspector is conversant with the location of these glands and by boldly incising through tissues and organs he saves himself the time needed to place the organ in a position to expose the glands with less cutting.

Mediastinal glands: The inspection of the posterior or caudal mediastinal gland follows. This gland is located at the posterior extremity of the posterior mediastinal region. It is the largest gland in the thoracic cavity, well exposed and easily examined. It is the gland in cattle most frequently affected with the lesions of tuberculosis. In removing the lungs, it is not infrequent that a portion of this gland remains attached to the carcass near the pillars of the diaphragm. After completing the inspection of this gland, we proceed to examine the median mediastinal gland. This gland is found just anterior to the posterior mediastinal group. A small gland which is found at the junction of the cephalic and ventral lobes of the right lung must not be omitted in the inspection, as lesions are quite often found in this gland.

Lungs: After completing the inspection of the lymphatic glands common to the lungs, a careful examination is made of these organs. They must be palpated at all times and incised when deemed necessary. The pericardium and heart must be carefully inspected. The trachea must be opened throughout its length, in search of possible lesions in the respiratory tract.

Liver: We proceed in our inspection from here to an examination of the liver. Lymphatic glands common to this organ are first examined. These glands are located on the posterior surface of the liver, imbedded in fat surrounding the vessels at the portal fissure. There are from three to five glands in this group and

lesions are found in approximately 12 per cent of the cases. In removing the liver from its normal attachments, it should be noted that all glands of the portal group remain attached to the liver or if a portion of them are left remaining attached to tissue in the duodenal depression, as one gland may be involved and the remainder of the group be free from infection. Therefore, all of the glands should be looked for and carefully examined. The liver is then prepared for inspection by passing the sharp edge of the knife over the surface to remove the blood and serum and provide a clean surface to make possible a careful examination, as occasionally minute lesions are found resembling small pearl-like nodes which seem to be located between the parenchyma and the outer membranes. They have the characteristics of tuberculous nodules and are so regarded. In cases of this kind the liver is repeatedly sectioned and at times larger nodes are discovered which aids in corroborating our diagnosis. These nodes may be found in the liver without the portal glands showing any apparent evidence of infection. No doubt they are primary lesions in the earlier stages of the disease.

Gastric glands: The glands next examined are the gastric. They are found in the area between the second and fourth stomachs and on the course of the gastric blood-vessels. These glands are easily located for examination. The serous membranes must not escape scrutiny, as lesions may be found on these membranes when evidence of the disease elsewhere is not observed. The spleen is required to be palpated and incised and the splenic lymph-glands which are located at the hilus of the spleen must be incised and carefully examined.

Mesenteric glands: We pass from this point to the inspection of the mesenteric chain of glands. As previously stated, the intestines have been transferred from the visceral truck to a stationary table, the surface area of which is sufficiently large to permit of their being spread out in a manner to facilitate their incising. Some skill is required to place the intestines quickly in a position to display the chain of lymphatics to the advantage of the inspector for their examination. This chain of glands lies along the lesser curvature of the intestines in the folds of the mesentery, extending throughout the length of the small intestines. Much time is consumed in examining these glands because of the great volume of lymphatic tissues to be incised and the standard of efficiency that we endeavor to maintain in our inspection. That is, the glands are required to be sliced as thinly as is

possible with a butcher's knife. Experience has taught us how easily a center of infection may escape observation in this massive group of glands, as not infrequently when the inspection is repeated and when no lesions were discovered in the first examination, a minute tuberculous focus is found in the section of the tissue which had not been previously exposed to view.

Colon and cecum: The colon lymph-glands are next examined. These glands are found in the right side of the spiral mass of the colon; one or two near the termination of the ileum. The cecal glands are also examined. These glands are found along the attached surface of the cecum. A few lymphatic glands are found also along the course of the rectum.

Ovaries and uterus: Following the inspection of the lymphatic glands common to the intestines, an examination is made of the ovaries and uterus. After completing our inspection of the viscera, we proceed to examine the skeletal lymphatic glands. The inspector assigned to this part of the inspection must have a clear and comprehensive knowledge of the anatomy of the carcass and must know where each and every group of glands is located and their anatomical relations. This knowledge is essential for reasons of economy and efficient conduct of the work. The skeletal lymphatic glands should be exposed for incising and examination with as little cutting of the tissues as possible, in order not to mutilate the carcass unnecessarily. In other words a cosmetic postmortem should be the rule.

Precrural glands: The first group of glands sought for examination are the precrural glands. These glands are voluminous and easily exposed for examination. They are located in the cellular tissue of the flank, just above and inward from the femoro-tibial articulation on the anterior border of the tensor facia lata muscle and are covered by a fibrous membrane known as the fel. In well-nourished animals they are found imbedded in a considerable mass of fat. By making a longitudinal incision through the fel and anterior to the muscle, the gland is easily exposed. Because of the removal of the hide, in cattle, the gland must be approached from the outer surface to avoid undue mutilation. In hogs these glands are approached from the internal surface. Subcutaneously and over the region of the flank are found located superficially a few lymph-nodes which are next inspected.

Inguinal glands: Following this, we proceed to make an examination of the superficial inguinal glands. These glands are located

at the base of the scrotum and in front of the inguinal ring. In steers they are imbedded in the cod fat. In females there are oft times fragments of the supramammary glands remaining attached to the carcass which must not escape the inspector's observation.

Ischial glands: The ischial lymphatic glands are next exposed. This is accomplished in enucleating the left group by grasping the knife in the right hand and boldly cutting the broad ligaments of the pelvis over the lesser ischiatic notch. These glands are imbedded in a mass of fatty tissue. The opening must be of sufficient size to permit of the introduction of the thumb and first finger, so that the gland may be grasped to permit of additional cutting to separate the fat from its normal attachments. The right ischial is removed in the same manner, only the incision for its removal is made by cutting the broad ligaments with a knife in the left hand.

Iliac glands: The next glands are the internal iliacs, one on each side, located at the upper third of the pelvic arch. These are large glands and in poorly nourished animals they stand out prominently exposed. Again, in well-nourished animals the glands are covered with fat and unless the inspector knows the exact location, considerable mutilation may result in his efforts to expose them for inspection.

Sublumbar glands: The sublumbar chain of glands is next examined. These glands are located in the sublumbar region. They lie along the course of the posterior aorta and are imbedded in fat. These are important glands, as they have the same relation to the lymphatic circulation of the posterior portion of the body that the prepectoral glands have to the anterior part of the carcass. With the possible exception of the anterior node of this group, it may receive its afferent vessels from the abdominal viscera, as it is found infected more frequently than any of the other glands of this group.

Kidneys: The renal glands and kidneys are next examined. The glands are found near the hilus of the kidney, imbedded in fat. They are usually exposed to view during the operation of inspecting the sublumbar glands. The kidney is then partly enucleated from its capsule and examined.

Peritoneum: The peritoneum is next carefully examined for lesions of tuberculosis. We now pass to examining the tissues in the region of the diaphragm, about its pillars, for possible fragments of the posterior mediastinal lymph-glands. As previously stated, the eviscerator in removing the lungs is not

always careful to cut sufficiently wide to keep the mediastinal gland intact.

Pleura: The parietal pleura is then carefully gone over. The diaphragm must be raised to permit of close observation. The sterno-diaphragmatic lymph-gland is next sought for examination. This gland is located at the junction of the diaphragm and the sternum, imbedded in a cushion of fat. It is a small gland and not always easily detected. Its efferent vessels pass to the supra-sternal lymph-gland which is located at the lower end of the intercostal spaces and superior to the sternum and covered by the triangularis sterni muscle. It lies in a small depression, imbedded in fat. It is easily exposed for examination.

Prepectoral glands: We pass from this gland to the inspection of the prepectoral groups. These glands are found at the entrance to the thorax, between the lower anterior borders of the first two ribs, laterally and inferior to the trachea and esophagus. These glands are the terminals of the cervical groups, their efferent vessels passing to the large lymphatic vein and thoracic duct. By making an incision parallel with the muscles of the neck, beginning at a point about the middle of the first rib and cutting downward (the carcass hanging, being suspended from the hind quarters) or an incision is at times made in line with the anterior border of the first rib, about one-half to one inch from the border. The gland is found imbedded in a mass of fat. If its exact location is known by the inspector, only a small incision is needed to expose it for examination. As a rule the gland is completely enucleated for inspection.

Cervical glands: The removal of the hide from the body of cattle begins at the median line. The incision extends throughout its length, terminating at the opening in the neck caused by the bleeding of the animal. This cut, together with the necessary incision for removing the trachea and esophagus, leaves a ragged edge on each half of the neck, particularly along that portion in which the atlantal and the median cervical glands are located. In severing the head from the body, in the parlance of the butcher, the head is cut short. That is, the cutting begins near the posterior borders of the lower jaw and continues to and through the occipito-atloid articulation, leaving the atlantal gland suspended on the edges of the upper part of the neck. This gland in its normal attachment is located just under the styloid process of the occipital bone and bordering the lateral aspect of the occipito-atloid articulation. In seeking these glands for examination, it

is necessary to palate the cut borders of the neck in this region. In the suspended carcass the median cervical glands are usually found but a short distance above the atlantal, also along the edges of the neck internally. Normally these glands are found on each side of the trachea and esophagus, just below the thyroid gland. This gland is sought for in the same manner as indicated for locating the atlantal.

Prescapular glands: This completes our inspection of the various groups of cervical lymphatic glands, unless we should regard the prescapular glands as accessories to this system of the lymphatic circulation, as they are at times termed the superficial cervical glands. These glands are located a little above and inward from the shoulder joint, imbedded in a cushion of fat and covered by the mastoido-humeralis muscles. The gland is usually enucleated for examination because of the low hanging position of the carcass. To remove the gland an incision about three inches long is made through the mastoido-humeralis muscle near its anterior border. The mass of fat inclosing the gland is grasped with the left hand and with a few further incisions, the fat is freed from its natural attachments. Skewers are used to bring together the edges of the severed muscles, giving the carcass the appearance of having been but slightly mutilated.

Axillary glands: The last group of glands usually examined are the axillary or brachial lymph glands. These glands are located in the midst of the brachial vessels at the point where they emerge from the thorax and enter the leg. The gland is readily accessible by making an incision through the muscles attached to the external surface of the ribs, beginning at a point near the location of the prepectoral gland and passing a knife upward as far as the external surface of the second rib. The opening must be sufficiently large to permit of the introduction of two fingers. The fat inclosing the gland is drawn down and with a few strokes of the knife it is released from its natural attachments. This gland is always completely enucleated for incising and examination.

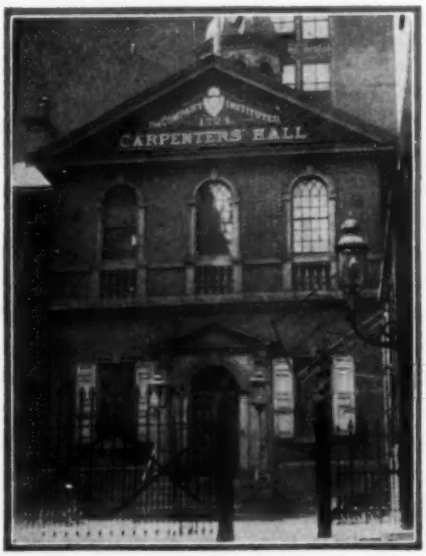
Bones: Following this, a general survey is made of the carcass, seeking abnormalities which may be found in joints, split bones and musculature. In examining the split sternum and spinal column the inspector should acquire the habit of slowly drawing the point of his knife down the entire length of the column, concentrating on viewing the area immediately surrounding the point of the knife, thus assuring himself that no part of the exposed

surface of the spinal column and sternum has escaped his observation.

Popliteal gland: Should no visible lesions of tuberculosis be discovered up to this time in our inspection, we proceed to make an examination of the popliteal and external iliac glands, as these groups of glands are not usually examined in the routine inspection except in no-lesion cases and those which have been passed for sterilization. These glands are deep-seated and their enucleation is of necessity associated with considerable mutilation.

The popliteal glands are removed for examination by making an incision parallel to the muscle fibers of the posterior portion of the thigh. They lie on the gastrocnemius, between the semitendinous and the biceps femoris muscles, just posterior to the femoro-tibial articulation. The external iliac glands are found near the inferior border of the external angle of the ilium. No difficulty is experienced in locating the position of these glands, but their exposure for examination can be accomplished only by much mutilation.

This practically terminates our inspection of the carcass for tuberculosis and time will not permit a further discussion with reference to the details of the final disposition of carcasses tanked for grease and those passed for sterilization.



Carpenter's Hall, Philadelphia.

TWO INTERESTING TURKEY DISEASES

By ERWIN JUNGHERR, *Bozeman, Montana*

Montana Agricultural Experiment Station

The following is a preliminary report on two rare turkey diseases, with principal lesions in the crop and esophagus, observed by this laboratory during the routine diagnostic work of the past few years. The first disease refers to the finding of a parasitic nematode; the second to the occurrence of mycotic lesions, both diseases located in the upper digestive tract.

1. A PARASITIC NEMATODE

The specimens submitted for examination came from a flock of pure-bred turkeys. The premises are located on the foot-hills of high mountains and are well taken care of; the gentle slope of the foot-hills provides natural drainage; the water supply is furnished by mountain springs, and the soil, rocky and sandy, is—except for a deficiency in phosphates and iodin as indicated by other conditions—beyond objection from a sanitary standpoint.

In February, 1927, a young turkey was examined, being disposed of by the owner on account of its inability to eat and resulting emaciation. The lower digestive tract and respiratory tract appeared to be normal; routine bacteriological examination was negative. The most striking lesion was a tympanites of the crop; this organ appeared to be tightly extended, like a drum, not being collapsible and pliable as in normal birds. On opening the crop, it was found to be void of food, but containing gas of foul-smelling odor. The mucous membrane was not appreciably thickened, the glands were swollen, punctiform and streaked hemorrhages being present. The dorsal curvature of the crop was coated to a great extent with a dirty yellowish, necrotic mass of irregular outline. The esophagus, cranial and distal of the crop, presented lesions of a similar nature as the ingluvium. Scrapings of the mucosa of the crop revealed the presence of operculated nematode eggs, about 60 x 25 μ, resembling the picture of *Capillaria contorta* in Hall's book.[1] This finding led us to further investigations, in the course of which we were able to extract from the swollen glands specimens of a nema-

Received for publication, July 15, 1927.

tode, about two inches in length, the total number being around 60. A second case from the same flock came under our observation when a young turkey with extensive, intestinal parasitism was examined. The lining of the crop did not show any lesions, but by strong light, either transmitted or reflected, we were able to discern hair-like, whitish convolutes, embedded in the submucosa of the crop. These convolutes covered an area of about one-half inch, and, on extraction, proved to be nematodes of the same genus as in the previous case.

Cram[2] and See Lü Hung[3] described recently a similar parasitic disease of the crop of turkeys for the first time in the United States. Cram identified the parasite, responsible in this outbreak, as *Capillaria annulata* and found the occurrence of this parasite associated with damp, marshy breeding grounds. It will be remembered that our findings, although in a very limited number of cases, happened in a flock raised on exceptionally dry, rocky ground. A tentative determination of the species involved showed a microscopic picture of a parasite coinciding with the description of the genus Capillaria. The tail end of the male seemed to correspond to the reproduction in Cram's publication of *Capillaria annulata*, but the female seemed to be lacking in the characteristic bulbar swelling of the cuticle behind the head. Dr. M. C. Hall had the courtesy to examine specimens of this parasite, submitted by us. Unfortunately, the specimens submitted did not contain males, and Dr. Hall was unable to make a specific determination, but he expressed the belief "that losses from worms of the genus Capillaria are probably more general and important in the United States than is realized."[4] Apparently this parasite has been described in the United States only once previous to this report.

II. A New Mycosis

The other turkey disease under observation, located in the upper digestive tract, is a chronic ulcerative affliction of the esophagus, crop, and glandular stomach. Most of our material came from the same turkey flock in which we have encountered a parasitic nematode of the crop, the rest of the material with similar lesions being from three flocks of widely separated origins.

On autopsy, specimens are generally in very thin flesh; mouth, respiratory tract and lower digestive tract are in healthy condition. Along the mucous lining of the esophagus, yellow, glove-finger-like processes may be observed, with a base about

$\frac{1}{16}$ inch in diameter, the base being circular and surrounded by a hemorrhagic ring. The processes are tapering toward the tip, somewhat curved, and protruding into the lumen of the esophagus for about $\frac{3}{16}$ inch. Such are the young lesions; older lesions form regular ulcers with a broad, circular base, the hemorrhagic ring being especially distinct 24 hours after death. The mass of the ulcer consists of a compact, yellowish mass with elevated center; the ulcers are firmly adherent to the mucous lining. Sometimes the ulcers are not cupola-shaped with flattened top, but have a broad base with a pointed top, resembling in structure certain adornments on pastries, made

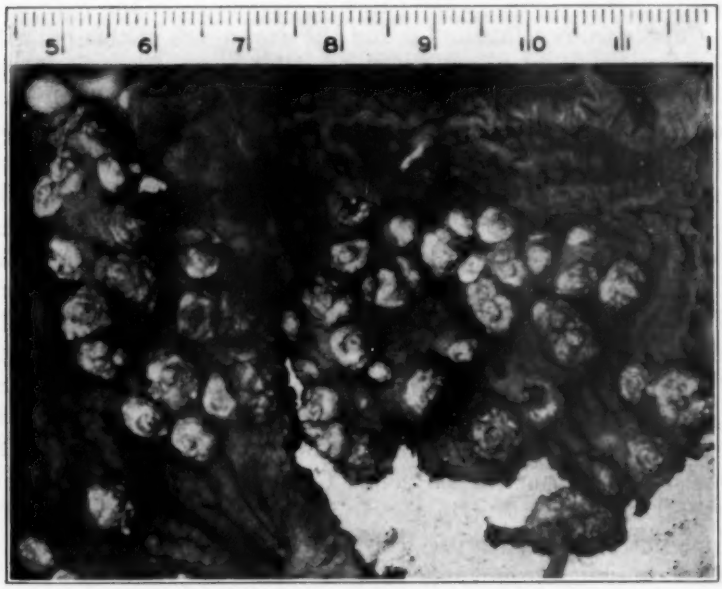


FIG. 1. Crop of turkey (mycosis). About natural size.

of stiff whipped cream; even the peculiar screw-like planes of such ones are present. The small mycotic growths seem to occur mostly in the esophagus, then larger ones in the crop (fig. 1). The lesions in the glandular stomach are located in the cardia and the esophageal region. The ulcers form a diffuse necrotic mass on the surface, revealing, on cross-sectioning, a depth of one-half inch. The gross pathological picture is that of a chronic, productive inflammation with necrotic surface. In one instance, we have observed a complete perforation of the stomach-wall, the necrotic areas extending into the adjacent lung.

On histopathological examination, the lesions show deep erosions of the surrounding mucosa. The border of the ulcer is formed by a heavy wall of mononuclear leucocytes. The ulcer itself consists of disintegrated cell masses, eosinophile cells, and numerous giant cells; the detritus masses are interwoven with a dense network of hyphae. Scrapings of the lesions do not reveal any discernible peculiarity, but after soaking of pieces of the diseased tissue, especially of young lesions, in normal NaOH over night, a dense mycelium may be seen. The hyphae are

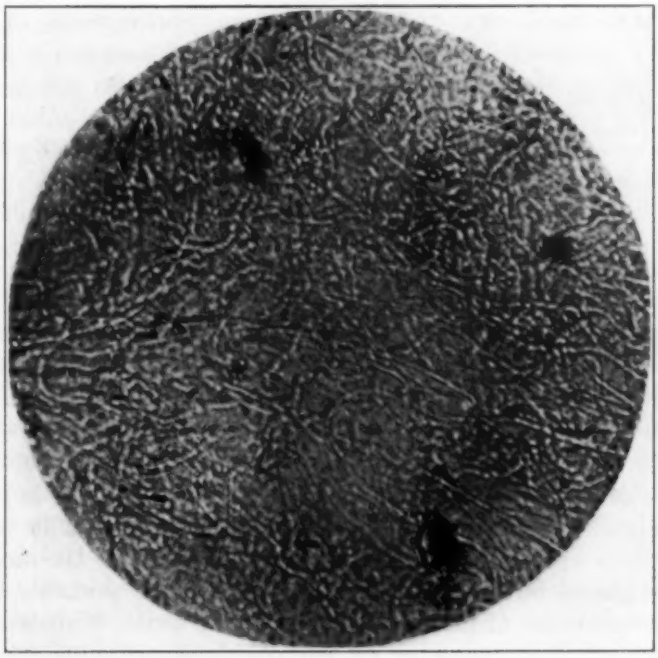


FIG. 2. Mycelium of fungus. x 336.

slender and not segmented; no true branching or spore-formations could be demonstrated satisfactorily (fig. 2). Subcutaneous and intravenous inoculations of guinea pigs and rabbits did not produce visible lesions after two months of observation. Attempts to grow the fungus on artificial culture media have been so far unsuccessful. From the microscopical appearance, the fungus involved seems to belong to the class of Fungi Imperfecti or Hyphomycetes.

The literature contains very few references to mycoses in poultry in general. The above-described disease could not be

definitely associated with thrush, as described by Pearl[5] or by Gallagher.[6] The former author describes thrush as having diphtheria-like lesions; the latter mentions grayish-white or yellowish-colored patches adhering to the mucous membrane without making reference to the distinct, glove-finger or cone-shaped processes into the lumen of the esophagus or crop.

Apparently the characteristic lesions we have described are not those of thrush and, as far as we can learn, have not been previously reported.

BIBLIOGRAPHY

[1]Hall, M. C.: Diagnosis and Treatment of Internal Parasites. (Veterinary Medicine, Chicago, 1927.)
[2]Cram, E. B.: A parasitic disease of the esophagus of turkeys. No. Amer. Vet., vii (1926), 10, pp. 46-48.
[3]Hung, See Lü: Pathological lesions caused by *Capillaria annulata*. No. Amer. Vet., vii (1926), 10, pp. 49-50.
[4]Hall, M. C.: Private correspondence, 1927.
[5]Pearl: Diseases of Poultry. (MacMillan Company, New York, 1927.)
[6]Ward and Gallagher: Diseases of Domesticated Birds. (MacMillan Company, New York, 1920.)

GLASS TRANSMITS ULTRAVIOLET RAY

Tuberculosis victims, rickety babies and other shut-ins can now enjoy the health-giving rays of sunlight indoors. The council on physical therapy of the American Medical Association has tried out the various glass substitutes on the market that have been designed to admit the ultraviolet rays cut out by ordinary window glass, and have found four that pass muster of both spectroscopic and biological tests.

Two of the samples tested are transparent to the visible rays of sunlight as ordinary window glass, though one can be supplied in an opaque form if desired. Both partake of the nature of true glasses but are more expensive. They will probably find considerable use ultimately, in solaria, nurseries, schools and playrooms.

The other two samples are of a less permanent character and did not rank quite so high in the tests as the first two in their power to admit anti-rachitic rays. One is composed of a wire-mesh screen filled with some sort of celluloidinous material while the other is a thin, fairly loosely woven cloth treated with a paraffin-like substance. These are opaque but more or less unbreakable and sell at a lower figure than window glass. They do not withstand weather so well as glass, but are well adapted, the council suggested in their report, for windows in cow-barns and chicken-houses in which they can be placed in winter and removed in summer.—*Science*.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

CORRECTING PARALYZED DROP-FOOT BY ANKYLOSING OPERATION

By JACOB LEBISH, *Bronx, N. Y.*

A Boston terrior, three years old, was brought to my office on January 29, 1926, suffering from paralysis of the right front foot, a condition that had been going on since birth. At the request of the owner to relieve this condition, I resorted to an operation whereby the carpal bones were removed, thus ankylosing the radius to the metacarpal bones, so that instead of the dog dragging his foot along the ground in a flexed position, he would walk on the flat of the foot, with the foot in an extended position.

OPERATION

On January 30, 1926, the animal was operated upon under ether anesthesia. The forearm and foot were thoroughly shaved and cleansed with alcohol and then painted with iodin. Thorough asepsis is of the utmost impotrance, as the entire limb is placed in a plaster cast, which is not removed for a period of two months. A tourniquet was applied above the elbow to prevent any bleeding during the operation, and a crescent-flap incision was made, exposing the carpal bones, and the epiphyses of the radius and metacarpal bones. The fascia surrounding the anterior extensor of the metacarpals, the oblique extensor and common extensor of the digits was cut away, and a careful dissection of the blood-vessels surrounding the carpals and tendons of the common extensor of the digits and lateral extensors followed. These tendons were cut and shortened so as to counteract the action of the flexor tendons. A bone-saw and forceps were used to remove the carpal bones and a small section of the epiphyseal cartilage of the radius and metacarpal bones. In other words, a V-shaped wedge was made so as to bring the foot forward as much as possible to prevent flexion.

The epiphyses of the radius and metacarpal bones were then brought into apposition by bringing together, with kangaroo

tendon the periosteum, tendons and part of the external carpal ligament. The skin was now brought together with interrupted sutures and the entire limb was immobilized in a plaster cast in an abducted position, so that there would be no irritation of the wound. Before removing the tourniquet, the limb was completely immobilized.

Conclusion

March 30, 1926, the cast was removed and ankylosis was complete. To obtain perfect results we must: (1) have thorough asepsis of surrounding environment as well as the surgeon; (2) an Esmarch's bandage or tourniquet far above the field of operation, so that the operation should be entirely bloodless; (3) removal of enough cartilage to give a chance for the freshened surfaces to form perfect ankylosis; (4) perfect apposition of the freshened surfaces following the operation; (5) thorough immobilization with plaster of Paris bandages for two months to allow for ankylosis; (6) to hold immobilized limb in an abducted position off the ground in order to avoid irritation of the operated part; (7) immobilization of the operated part should be complete before the tourniquet is removed.

Indications

The indications for this operation are found in completely or partially paralyzed lower parts of the extremities, provided there are not enough normal muscles left which can be used for transplantation. If there are enough muscles surrounding the joint which, to electric reaction, show that they are normal, one can utilize them by transplantation, so as to counteract the strong pull on one side by transplanting some of these muscles to the antagonistic ones.

Thee and thine to the City of Penn;
Forget not when—September 13-14-15-16

HERNIOTOMY IN A BOAR

By H. S. Lames, *La Porte City, Iowa*

On April 26, 1927, I was called to castrate a boar which to all appearances was physically sound. The boar was securely restrained by means of a rope in the mouth and rope casting-hobbles. The field of operation was thoroughly cleansed and

disinfected. I proceeded to operate, using the covered method of castration, removing the tunica vaginalis communis and the external inguinal ring with the emasculator. I removed the left testicle first. Before releasing the animal I raised the flaps of the scrotum, where, to my surprise, I found the intestines plainly visible.

Being hampered by lack of help and equipment, I was unable to perform the inguinal operation for hernia. I replaced the intestines and found the lumen of the hernia one and one-quarter inches in diameter. The canal between the anterior extremity of the scrotum and the external inguinal ring was packed tightly with sterile gauze and the scrotum was sutured securely, in the same manner as in cryptorchid colts. In thirty-six hours (in the equine it is not safe to allow the gauze to remain longer than twenty-hour hours) I removed the gauze and found that the swelling had completely closed the inguinal canal. The boar made a complete recovery with no further treatment.

The boar came from a prize sow and was sacrificed at three months of age because the left testicle was considerably larger than normal. At the time of castration, however, from all external appearances, the boar was sound, but on close examination the lumen formed by the tunica vaginalis communis of the left side was three quarters of an inch in diameter and that of the right one-quarter of an inch in diameter.

See Philadelphia—September 13-14-15-16.
Rich in History; active in Industry;
Renowned in Medical Science

ECHINOCOCCUS CYSTS IN THE LIVER OF HOGS

By HARRY MORRIS, *Baton Rouge, La.*
Louisiana Experiment Station

Echinococcus cysts are found in about five per cent of the hogs s'aughtered at the Municipal Abattoir at Baton Rouge, Louisiana, according to Dr. J. I. Martin, Manager. In past years the infestation ran as high as twenty per cent but there has been a marked reduction in the number of infested animals, which may be attributed to various conditions. The hogs are produced locally or within a radius of thirty miles of the City and the majority of them come from the high lands on the east side of the Mississippi River, rather than from the alluvial areas on

the west side, which is devoted largely to sugar-cane and rice culture.

The specimen from which the accompanying photograph was made was presented by Dr. Martin to the Department of Veteri-

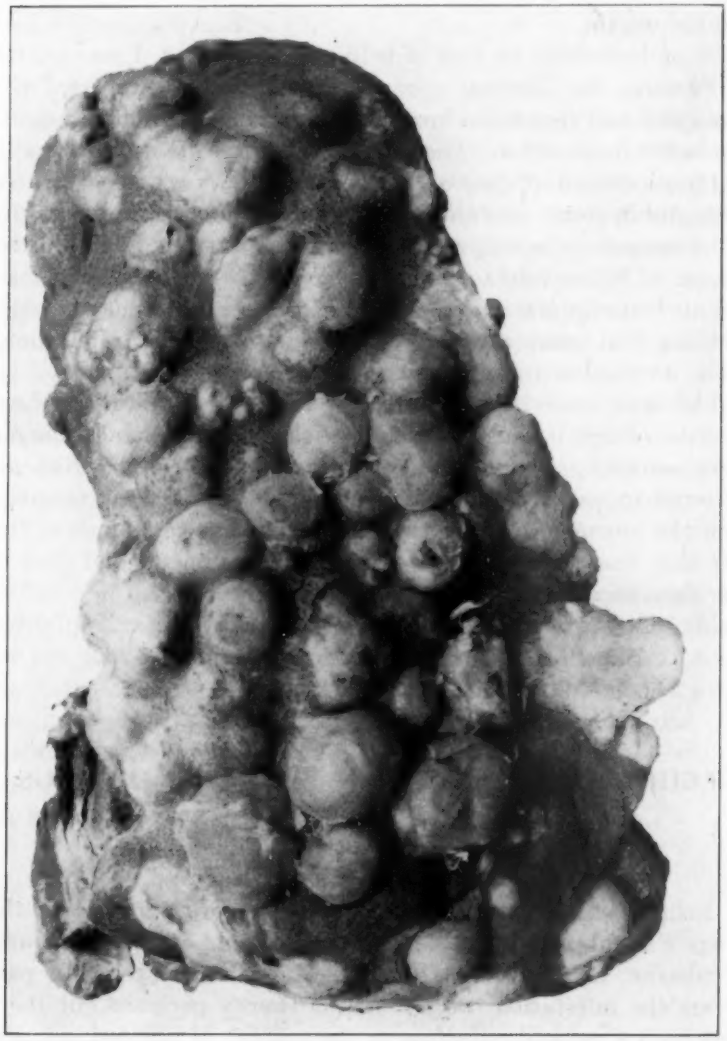


FIG. 1. Echinococcus cysts in lobe of hog liver. (Photographed by Dr. C. W. Edgerton, Plant Pathologist, Louisiana Experiment Station.)

nary Science of the Louisiana State University. The picture shows one lobe of the liver which was almost completely filled

with cysts. There was a great variation in the size of the cysts, which would indicate a continuous source of infection; some cysts were no larger than a pea, while others measured over two inches in diameter, as is shown in the photograph (fig. 1). The percentage of infested swine with the cysts would indicate that a great many hogs were hosts to the adult tapeworm, *Echinococcus granulosus.*

The ecnomic importance of the echinococcus cysts to the swine industry in this country has never been determined, except that such livers are not fit for human consumption. A hog may carry cysts in the liver, spleen and lungs and show no physical symptoms before slaughter. Such carcasses appear normal in every way and pass inspection.

The gradual decrease in infestation among hogs during the past few years may be attributed to various reasons. First may be mentioned the exceedingly dry years of 1924-25, in which the total rainfall was below normal. This caused a general decrease for some time in infestation with the majority of the internal parasites common to live stock in Louisiana. Next may be mentioned the influence of correct information concerning the cysts, disseminated among the farmers through contact with the meat inspection service of the Municipal Abattoir. An ordinance requires that all locally produced meat sold in the town must be killed and inspected at the abattoir. While delivering his hogs, the farmer usually makes an inspection trip through the plant. Quite often he sees his own hogs slaughtered and the cystic livers condemned if any are present. This causes him to seek information on the subject from the manager. Dr. Martin then explains the life cycle of the tapeworm of the dog to the farmer and gives him information concerning treatment and sanitary control.

This is only one of the many benefits derived by the live stock owners of this community from a municipally owned and operated abattoir. It provides a centralized market for the producer and a clean, wholesome product for the consumer and stands today as a memorial to the memory of the late Dr. W. H. Dalrymple, who was instrumental in its erection.

Meet me where the Continental Congress met;
Sign where the Declaration of Independence was signed—
In Philadelphia. September 13-14-15-16

the west side, which is devoted largely to sugar-cane and rice culture.

The specimen from which the accompanying photograph was made was presented by Dr. Martin to the Department of Veteri-

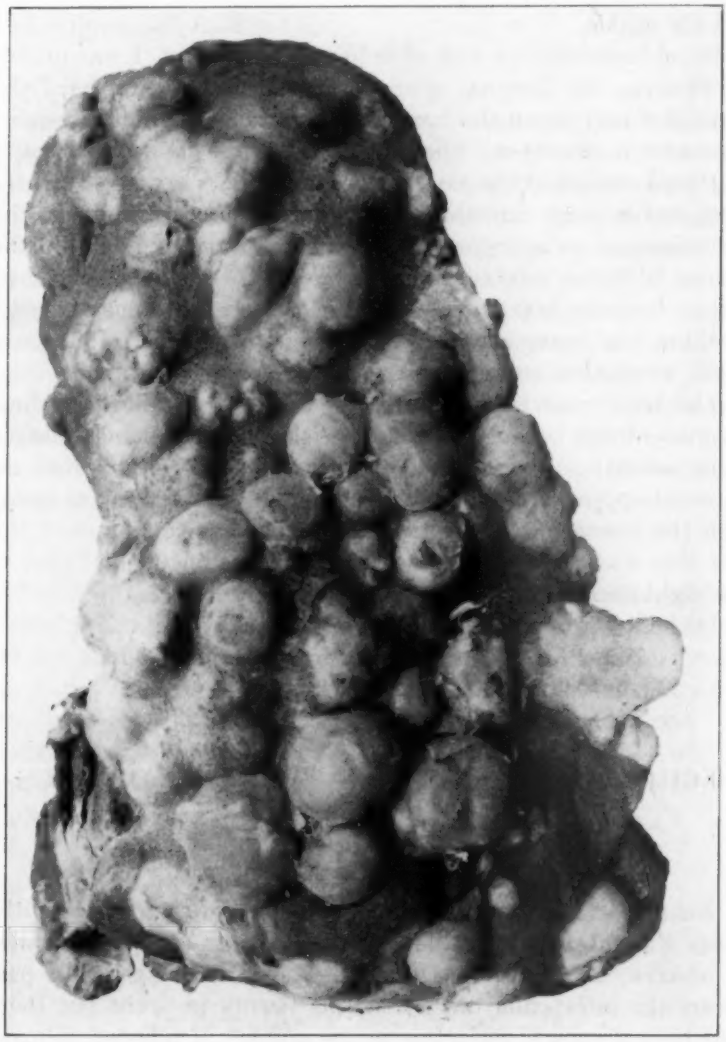


FIG. 1. Echinococcus cysts in lobe of hog liver. (Photographed by Dr. C. W. Edgerton, Plant Pathologist, Louisiana Experiment Station.)

nary Science of the Louisiana State University. The picture shows one lobe of the liver which was almost completely filled

with cysts. There was a great variation in the size of the cysts, which would indicate a continuous source of infection; some cysts were no larger than a pea, while others measured over two inches in diameter, as is shown in the photograph (fig. 1). The percentage of infested swine with the cysts would indicate that a great many hogs were hosts to the adult tapeworm, *Echinococcus granulosus.*

The ecnomic importance of the echinococcus cysts to the swine industry in this country has never been determined, except that such livers are not fit for human consumption. A hog may carry cysts in the liver, spleen and lungs and show no physical symptoms before slaughter. Such carcasses appear normal in every way and pass inspection.

The gradual decrease in infestation among hogs during the past few years may be attributed to various reasons. First may be mentioned the exceedingly dry years of 1924-25, in which the total rainfall was below normal. This caused a general decrease for some time in infestation with the majority of the internal parasites common to live stock in Louisiana. Next may be mentioned the influence of correct information concerning the cysts, disseminated among the farmers through contact with the meat inspection service of the Municipal Abattoir. An ordinance requires that all locally produced meat sold in the town must be killed and inspected at the abattoir. While delivering his hogs, the farmer usually makes an inspection trip through the plant. Quite often he sees his own hogs slaughtered and the cystic livers condemned if any are present. This causes him to seek information on the subject from the manager. Dr. Martin then explains the life cycle of the tapeworm of the dog to the farmer and gives him information concerning treatment and sanitary control.

This is only one of the many benefits derived by the live stock owners of this community from a municipally owned and operated abattoir. It provides a centralized market for the producer and a clean, wholesome product for the consumer and stands today as a memorial to the memory of the late Dr. W. H. Dalrymple, who was instrumental in its erection.

Meet me where the Continental Congress met;
Sign where the Declaration of Independence was signed—
In Philadelphia. September 13-14-15-16

REVIEWS

MANUAL OF VETERINARY BACTERIOLOGY. Captain Raymond A. Kelser, V. C., U. S. A. 525 pages with 87 figures in the text. Williams and Wilkins Co., Baltimore, 1927. Cloth, $5.50.

There is very little enthusiasm for things veterinary, if one measures the amount by the standards of American big business. However, there are enthusiastic veterinarians, such as Captain Kelser, who has had the courage to prepare a thorough text on veterinary bacteriology and marked success in finding a publisher. We do not know of anyone better qualified by temperament, training and experience to write such a book than is the author and no publisher that takes greater pride in its scientific publications of this character than the publishers of the *Journal of Bacteriology*.

The author has used the classification of the Society of American Bacteriologists, for which he should be commended. It is better to use it than to criticize it. He has introduced a few chapters on laboratory procedures and methods. We doubt the wisdom of including in a text on general bacteriology a discussion of technic. The science of microbiology has developed to such an extent that both textual material and methods are deserving of full and independent consideration such as can be better given in separate volumes. We believe that this is true also of veterinary bacteriology.

The section on general microbiology is necessarily very brief and suggests the desirability of prescribing a course in this subject for veterinary students preparatory to a consideration of the special field. We find that a knowledge of the whole field of microbiology is needed by veterinarians more than by any other group or profession.

The treatment of infection and immunity is lucid but very brief and not comprehensive. The specific diseases are given very careful consideration and this portion of the book is characterized by a refreshing down-to-dateness. The author's recent experiences in the tropical and subtropical Orient are reflected in the excellent part which deals with the protozoa. There are chapters on the filtrable viruses, serological tests and hematology. The introduction of the last-mentioned subject into a text on bacteriology is something of an innovation. Immunizing agents are

handled without much elaboration and milk and water are given only a few pages.

On the whole the book is a credit to the author and a valuable contribution to veterinary text-book literature. It is to be hoped that it will receive a hearty welcome in the colleges and on the part of those engaged in veterinary activities that involve a knowledge of the microbiological problems of animal industry.

W. G.

Meet me where Penn met the Indians—
Philadelphia—September 13-14-15-16

TRAINING THE POLICE DOG. Fred Kollet. 57 pages, illustrated. Fourth edition revised and enlarged. Judy Publishing Company, Chicago, 1927. Paper, $1.00.

This is the fourth edition of this little book to make its appearance in less than three years, indicating the popularity of the subject at this time. The author is a practical breeder and trainer, having spent more than twenty years in training dogs for police and other practical work, both in Germany and America. The book proper is divided into twenty-eight chapters, the last of these being devoted to the official standard of the shepherd dog, as recommended by the Shepherd Dog Club of America, Inc.

Attend the meeting in Philadelphia,
September 13-14-15-16,
Where many things began and the best continue

THE DACHSHUND. Grayce Greenberg. 27 pages, illustrated. Judy Publishing Company, Chicago, 1927. Paper, $1.00.

This monograph is said to be the only work on the dachshund that is available in the English language. The author is president of the West Coast Dachshund Club, Los Angeles, Calif., and the owner and breeder of championship dogs. This monograph contains chapters on the history of the breed, breeding, traits and disposition, training and usefulness, care, faults to guard against, and standards of the breed.

Meet me where the Continental Congress met;
Sign where the Declaration of Independence was signed—
In Philadelphia. September 13-14-15-16

ABSTRACTS

EXPERIENCES DE TRANSMISSION DE LA TUBERCULOSE HUMAINE AU CHIEN (Experiments in the Transmission of Human Tuberculosis to the Dog). G. Petit, L. Larisset and M. P. Kfouri. Presse Méd. (1925), 64, p. 1082. Abst. in Amer. Rev. Tuber., xv (1927), 1, p. 21.

The human origin of tuberculosis of the dog and cat, and the resulting dangers of family infection are well known. The unity of the two types of tuberculosis is indisputable. Lesions of caseous pneumonia with cavities were produced experimentally in dogs by infecting them through endobronchial and transthoracic routes, and sputum rich in tubercle bacilli was obtained. The lesions were similar to those of human pulmonary tuberculosis.

E. H. K.

Meet me where Penn met the Indians—
Philadelphia—September 13-14-15-16

HUNDENTUBERKULOSE MIT EINEM NICHTZUCHTBAREN VIRUS (Tuberculosis in Dogs Caused by Non-Cultivatable Acid-Fast Bacilli). K. Lanken. Beitr. z. Klin. d. Tuberk. (1926), lxii, p. 709. Abst. in Amer. Rev. Tuber., xv (1927), 1, p. 21.

A case of tuberculosis in a dog is recorded, which produced a thickened omentum with lymph-nodes like cartilage. In the tuberculous tissues there were large numbers of acid-fast bacilli, which would not grow on the different media tried. The material was pathogenic for other animals, but pathogenicity declined with successive passages through animals.

H. J. C.

Thee and thine to the City of Penn;
Forget not when—September 13-14-15-16

REFLECTIONS ABOUT COMPULSORY VACCINATION OF DOGS AGAINST RABIES. K. Schern. Berl. Tier. Woch., (1927), 9, p. 140. Abst. in Tierärzt Rdsch., xxxiii (1927), 12, p. 214.

The author recalls that every new step taken in the advancement of science had its hindrances. Even Robert Koch had difficulties in having recognized his conception of the cholera bacillus. Many prejudices have to be overcome by the pioneers

of scientific research before they gain due recognition. They often meet the same fate as Galilei or Savonarola.

The same is now experienced regarding the immunization of dogs against rabies and only through extensive trials and careful observations will it be possible to establish definitely the value of the procedure.

The vaccination with fixed virus, which is attenuated by a special method, is, according to Schern, not dangerous to human beings. There is not a case of furious rabies known to have developed after such treatment. On the other hand, it is possible that dogs, injected with fixed virus, develop, under certain predisposing conditions, paralytic rabies, so-called fixed-virus rabies. Such fixed-virus rabies may develop if the injected doses are too large or if the virus possesses an extraordinary virulence. But this form of rabies is of no importance from the standpoint of transmissibility, because a dog, paralyzed by this type of rabies, lacks the dreaded symptoms of the furious form, is not able to bite or to run away, because the paralysis of the hind limbs makes it impossible for the animal to move. There is no case recorded, in which a dog, vaccinated against rabies, has transmitted the infection to a human being or any other living creature and, furthermore, there never has developed a case of furious rabies following vaccination. According to Schern, there is a possibility that an immunized dog can be a carrier of rabies virus, but it is at least questionable if such a virus-carrying dog is dangerous. The virus-carrier does not manifest any pathological desire to bite, as a rabid dog does. Notwithstanding that there is a possibility that such a virus-carrier would, under certain circumstances, bite a human being or an animal, such an attack or bite would not be the result of any possible infection but rather merely the result of ordinary viciousness, to which normal dogs are often subject. In such a case, there would be a possibility of the development of rabies in the bitten individuals. For prevention of such cases, the compulsory vaccination of dogs against rabies should be inaugurated. Besides, the existence of street-virus carriers should be emphasized and this danger cannot be eliminated, even with the strictest veterinary police measures.

In conclusion it may be stated that the compulsory vaccination of dogs would be an ideal procedure to combat this dreaded disease.

O. G.

IMPRESSIONS FROM THE INTERNATIONAL CONFERENCE ON RABIES IN PARIS. Kraus, Director of the Serotherapeutic Institute. Tierärzt. Rdsch., xxxiii (1927), 25, p. 466.

The first International Conference on Rabies, in Paris, which had actually been planned since 1914, was held April 25-30 this year. This conference was attended by representatives of almost every nation, such as: Germany, Austria, France, England, Italy, Japan, America, etc., and was presided over by Dr. Roux, director of the Pasteur Institute, the only living co-worker of Pasteur. The results of the deliberations have been compiled and will offer important lines for further investigations and more positive directions for institutions conducting protective vaccination. The establishment of a central laboratory for the investigation of rabies in dogs has been suggested, which is to be maintained by the Hygienic Committee of the League of Nations and which shall also have for its purpose to maintain dependable vaccines, to test them and to place them at the disposal of all institutes. The classical Pasteur method has been recognized as the best standard of protective vaccination, and next the Högyes method, introduced in Budapest (both of these products contain the attenuated living virus); as a third method the conference recommended Fermi's procedure (killed virus), which was introduced in Italy. For preventive vaccination, the conference approved and recommended the Japanese method of Umeno and Doi; this procedure has been recommended to be employed in all localities where rabies is prevalent.

The striking feature of the conference was the splendid feeling which prevailed among the delegates, especially the wonderful hospitality of the Pasteur Institute towards the delegates and particularly so towards the German representatives. On April 28, a special session was held at the suggestion of the author, on which occasion, with unanimous approval, the International Association of Microbiology was organized.

A. E.

Meet me where the Continental Congress met;
Sign where the Declaration of Independence was signed—
In Philadelphia September 13-14-15-16

"Her father is familiar with many tongues."
"Ah, a linguist?"
"No, a physician."—*Youth's Companion.*

ARMY VETERINARY SERVICE

CHANGES RELATIVE TO VETERINARY OFFICERS

Regular Army

Captain Jacob L. Hartman, originally under orders to report to Fort Benning, Ga., for duty, is directed instead to report for duty at Fort Bliss, Texas.

Lt. Colonel Geo. A. Hanvey, Jr., is relieved from observation and treatment at the Walter Reed General Hospital, Washington, D. C., and ordered to proceed to his proper station, Fort Ethan Allen, Vt., and thence to his home at Abbeville, S. C., to await retirement.

Captain Lloyd C. Ewen is, in addition to his present duties at the Reno Quartermaster Intermediate Depot, assigned to the remount purchasing and breeding headquarters, Ft. Reno, Okla., pending the arrival of Captain Jacob E. Behney, V. C., at the purchasing and breeding headquarters, about Oct. 1, 1927.

Captain Raymond I. Lovell is relieved from further duty at Front Royal quartermaster intermediate depot, Front Royal, Va., is assigned to station at Jefferson Barracks, Mo., and, upon relief from observation and treatment at Walter Reed General Hospital, Army Medical Center, Washington, D. C., will proceed to that station and report in person to the commanding officer for duty.

Captain Jean R. Underwood is relieved from further duty at Fort Myer, Va., to take effect on or about August 1, 1927, and will then proceed to Fort Clark, Texas, and report in person to the commanding officer of that post for duty.

Captain Howard N. Beeman is relieved from assignment at Fort Riley, Ks., to take effect at such time as will enable him to sail on transport leaving San Francisco, on or about November 3, 1927, for the Philippine Islands for duty.

Captain Harry L. Watson is assigned to duty at Camp Lewis, Wash., to take effect upon completion of his present tour of foreign service.

Lt. Colonel William P. Hill is relieved from further assignment and duty at the Army Veterinary School, Army Medical Center, Washington, D. C., to take effect on or about July 15, 1927, and will report at Fort Benning, Ga., for duty.

Reserve Corps

New Acceptances

Captains:
- Davis, Howard Burtis.....56 Garden St., Hartford, Conn.
- Meeks, Robert B.....1806 Walker Ave., Kansas City, Mo.

First Lieutenant:
- Young, Wesley A.....Spring & Main Sts., Medfield, Mass.

Second Lieutenants:
- Douglass, Oliver T.....Malcom, Iowa.
- Haxby, Robert J.....Clarinda, Iowa.
- Henry, Leo M.....917 4th Ave., N., Fort Dodge, Iowa.
- Lee, Chester D.....Merrill, Iowa.
- Lerdal, Jos. Herbert.....Goldfield, Iowa.
- Pas, Harold Henry.....Orange City, Iowa.
- Shannon, Ladwin D.....Waukee, Iowa.
- Stueland, Lincoln A.....Kanawha, Iowa.
- Swink, Clarence E.....Jolley, Iowa.
- Welsh, Wm. Edward.....Artesia, N. Mexico.

Promotions

Steele, Frederick H., to Captain. Address, 307 E. Holmes St., Huntsville, Ala.

Separations

Garbutt, Raymond J.,	2nd Lieut.	Failed to accept reappointment.
Jespersen, Edward C.,	1st Lieut.	Resigned.
Leneker, Earl B.,	2nd Lieut.	Declined reappointment.
Sinnerud, Otto P.,	2nd Lieut.	Discharged.
Stricker, Charles L.,	2nd Lt.	Resigned.
Williams, Fred W.,	2nd Lt.	Failed to accept reappointment.

Meet me where the Continental Congress met;
Sign where the Declaration of Indpendence was signed—
In Philadelphia. September 13-14-15-16

NOTICE OF EXAMINATION FOR APPOINTMENT IN THE VETERINARY CORPS, REGULAR ARMY

Examination for the purpose of qualifying candidates for appointment in the Veterinary Corps, Regular Army, will be held beginning September 5, 1927, throughout the continental United States.

The applicant must be a male citizen of the United States between the ages of 21 and 29 9/12 years, and a graduate of a recognized veterinary college.

Application blanks, Form No. 62, A. G. O., may be obtained from The Adjutant General or The Surgeon General, U. S. Army, Washington, D. C., or from the Commanding Officer or Surgeon of any military post or station, and when completed should be forwarded direct to The Adjutant General, U. S. Army, Washington, D. C.

Veterinarians desiring to take the examination should obtain the necessary application blank and submit it at the earliest practicable date.

Thee and thine to the City of Penn;
Forget not when—September 13-14-15-16

A bill designed to stop farmer vaccination against hog cholera, sponsored by the Illinois State Veterinary Medical Association, received rough treatment at the hands of the Committee on Agriculture in the House of Representatives recently, according to press reports emanating from Illinois. The attack on the bill is reported to have been led by Mr. Homer Tice, representative from Menard County.

MISCELLANEOUS

SEE PHILADELPHIA FROM A TO Z

A

Art, archeology, architecture, old and modern.
Academy of Fine Arts.
Academy of Natural Science.
Art Museum.
Art collections—Johnson Gallery, Memorial Hall; Academy of Fine Arts, and others.
Architecture, typical of Philadelphia, in Locust, Pine, Camac, Carlisle, Clinton, Latimer, Spruce, Broad, and Spring Garden streets.
Antique stores.
Aquarium.

B

Bartram's Gardens, 1731.
Books and book-stores, fascinating and quaint, with rare books and prints.
Bridle paths in Fairmount Park.
Boats to Wilmington or Trenton, passing ship-yards and old New Jersey towns.

C

Congress Hall.
Churches: Swedenborgian Cathedral (fine stained glass); Christ Church, 1750; Gloria Dei, 1700; St. Joseph's; St. Peter's, 1761; First Presbyterian Church, Washington Square; Old Pine Street Presbyterian Church; Memorial Chapel at Valley Forge.
Carpenter's Hall—where Patrick Henry spoke and where Washington, Jefferson, Adams and Franklin deliberated. First Continental Congress met here in 1774.
Commercial Museum.
Clubs: Poor Richard Club, Princeton Club, Sketch Club, Plastic Club, Art Club.
Chinese stores.
Chinatown.
Chinese Collection, extremely interesting, University of Pennsylvania Museum.

D

Dairy farms and Dairy cattle (model dairies and pure-bred herds).
Declaration of Independence—Hall where signed.
Delaware River Bridge.
Docks on Delaware River.
Dry-dock at Navy Yard.
Door-ways in old houses.

E

Entertainment: Roof gardens, cabarets, night clubs, theaters, moving pictures, lectures, amusement parks.

F

Fairmount Park.
Fountain, Rittenhouse Square.
Franklin relics: portraits, his papers, printing-press, pew, sword.
Franklin's grave.
Fine farming country surrounding city.
Factories.
Ferries.
Frocks from fascinating shops.
Free Library—oldest in United States.
Fire signs—markers of old fire insurance associations.

G

Guns at arsenal and Navy Yard; old Spanish ones at Memorial Hall.
Gloria Dei (Old Swedes' Church), 1700.
Guild Hall of the Carpenters, 1724.
Gargoyles, U. of P. dormitories.
Germantown, historic section.
Gardens: Fairmount Park, Bartram's and suburbs.

H

Historical houses, papers, china, silver, furniture, portraits, statues, sites, monuments.
Hospitals for man and beast.
Humane societies.
Homes of historical and modern men of prominence and celebrities—actors, poets, authors, financiers, editors.

I

Independence Hall.
Indian collection. U. of P. Museum.

J

Johnson Art Collection.
Japanese shops.
Jails (keep out).

K

Kids in the city playgrounds and bathing beaches.
King's Highway (now Chester Pike).
Keith's Theater.

L

Liberty Bell.
La Fayette: Portrait by Sully, in Independence Hall; marker where wounded at Brandywine battlefield.
Lippincott Publishing Company, Washington Square.
Letitia Penn House.
Library Company, founded by Franklin, now at Locust and Juniper streets (Penn and Franklin relics).
Libraries: Ridgeway, Philadelphia, Historical, University of Pennsylvania, Mercantile, Apprentices.

M

Museums: Art, historical, University, science, commercial.
Memorial Hall Museum in Fairmount Park.
Mint of the United States.
Mansions, old and new.
Masonic Temple.

N

Navy Yard, League Island.
Numerous walks, drives, rides (by trolley, boat, bus and train).

O

Observatory, astronomical, of U. of P.
Old Swedes' Church (Gloria Dei).
Old streets and sections—Camac, Carlisle, Clinton, Latimer and Van Pelt streets.
Old houses: 225 South 8th Street (1786), 1260 South 9th Street, home of Joseph Bonaparte, once King of Spain; Betsy Ross House; Benedict Arnold House; Chew Mansion.

P

Parks: paths for walks and horse-back rides.
Plants in Horticultural Hall, parks and suburban places.
Pennsylvania Hospital, built in time of George II; charming group of old buildings, fine stairway; picture by Benjamin West, "Christ Healing Sick."
Philosophical Society, 1700; Franklin and Jefferson once Presidents.
Palladian windows, numerous and beautiful.
Pikes: Lancaster Pike, first in this country; Darby-Chester Pike, pre-Revolutionary road.

Q

Quaker Meeting Houses: one on 12th Street, attended by Whittier; Merion Meeting, and Haverford Meeting, at both of which William Penn preached.
Quaint old streets, courts, alleys and houses; book-shops and rare-print shops.
Quadrangle, University of Pennsylvania.

R

Roads, leading out through beautiful suburbs and country scenes.
Racing sculls on the Schuylkill river.

S

Streets where Washington, Jefferson, La Fayette, Henry, Adams and Lincoln once walked.
Stores with articles gathered from all the world.
Swimming-pools.
Suburbs: beautiful estates and artistic homes.
Statues of William Penn: City Hall and Pennsylvania Hospital.
Stenton, built 1728, home of Penn's secretary, James Logan, and headquarters of the British General Howe.
Silver, antique, Memorial Hall.
Society for the Promotion of Agriculture, old books and portraits at Veterinary School.

T

Theaters.
Tea-rooms.
Taverns—historic.
Trumbull's portrait of the Signing of the Declaration of Independence.
Treaty Elm Monument.

U

University of Pennsylvania.
Union League.
United States Arsenal.

V

Veterinary School, U. of P.
Valley Forge, where Revolutionary soldiers encamped and suffered.
Van Dyck pictures in art collection.
Velasquez pictures.

W

Walnut Street Theater, oldest in U. S., still used as a theater.
Washington: portraits by Stuart, Peates and Sharples; statues; church pews; papers; relics.
Washington Square, historical and typical.
Wistar House, 4th and Locust streets, home of Dr. Wistar for whom Wistaria is named.
Wayne, Anthony—home and birthplace at Paoli; grave at St. David's Church.
West, Benjamin—home at Swarthmore; painting in Pennsylvania Hospital.
Washington's headquarters at Germantown, Valley Forge and Brandywine.
Wissahickon: famous for beauty, beloved of poets.

X

Xanthochroi: still a few to be seen on Chestnut, Walnut and Broad streets.
Xenon in our laboratories.
X-ray experts in our hospitals.
Xenophon's works in the University of Pennsylvania Library.
Xenopterus—at the Aquarium.
Xenurus—at the Zoo.

Y

York Road—interesting ride by bus or trolley.
Y. W. C. A.—Y. M. C. A.

Z

Zoological Gardens.
Zephyrs on the Delaware.
Zulvaga painting.

MRS. LOUIS A. KLEIN.

EASTERN STATES TUBERCULOSIS CONFERENCE
Atlantic City, 1927

'Tis not with streaming banners gay,
Nor cheering crowds along the way;
No clicking cameras await
To greet the strangers at the gate.

But all unheralded they come,
Sans bugle and sans fife and drum,
'Tis but the legionnaires who fight
Tuberculosis' broods of night.

When wars in far-off China rage
Details appear upon front page,
But to the people all is vague
In our war against the grim white plague.

The champion of the roped ring
Receives the ransom of a king,
But men who deadly germs subdue
Don't scintillate in public view.

The swimmer battling with the surf,
The race-horse speeding o'er the turf,
Polo and football heroes proud,
All hold their glamor for the crowd.

Some gain a high place in the sun
By a sensational home-run;
And loud resounds from near and far
The praises of a movie star.

Vox populi screams with delight
At some dramatic airplane flight:
But what acclaim for men like these,
The conquerors of a dread disease.

All but unknown to fame and wealth
The guardians of the Nation's health
Unite in conference and plan
To thwart the unseen foes of man.

—Harold N. Guilfoyle.

COMMENCEMENTS

ALABAMA POLYTECHNIC INSTITUTE

The degree of Doctor of Veterinary Medicine was conferred upon three graduates of the Alabama Polytechnic Institute, at the annual commencement exercises, May 24, 1927.

H. D. Bradshaw J. Scott
C. B. Thames

Thee and thine to the City of Penn;
Forget not when—September 13-14-15-16

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

Commencement exercises at the A. and M. College of Texas were held May 31, 1927. Two graduates in veterinary medicine received their degrees at that time.

R. A. Self M. B. Starnes

A. V. Young was graduated at the close of the first term, February 2.

Meet thy friends in the Friendly City—
Philadelphia, September 13-14-15-16

IOWA STATE COLLEGE

At the commencement exercises of Iowa State College, held June 13, 1927, the degree of Doctor of Veterinary Medicine was conferred upon twenty-four candidates:

Raymond Arpke
John Buck*
Glade Chapin
Harold J. Classick
Roland Coe
Oliver T. Douglass
Fred Harbaugh
M. C. Hawn
Robert Haxby
Mack Hays
Leo M. Henry
T. S. Hsiung
Curtis C. Lawrence
Chester D. Lee
Joseph H. Lerdal
Harold H. Pas
Roscoe Ralph
E. M. Redden
Ladwin D. Shannon
L. A. Stueland
Clarence E. Swink
Dick N. Voetberg
Edward Welsh
David E. Wright

The second annual Honors Day Program was held in the Gymnasium, May 20. Among the senior students who attained the highest scholarship standing for the entire college course,

*Graduated March 18, 1927.

in their respective departments, were Harold J. Classick, in veterinary medicine, and Fred G. Harbaugh, in animal husbandry and veterinary medicine. Honor veterinary student in the junior class, Walter Chivers; sophomore class, Walter L. Nilson; freshman class, Walter R. Anderson.

The George Judisch Scholarship Prize of $25 for the highest general average was awarded to Harold J. Classick.† George S. Carter won the scholarship medal as the student having the highest scholarship record in his class for the college year 1925-26. Dr. M. A. Emmerson ('26) and H. J. Classick and Fred Harbaugh, of the graduating class, were elected to Phi Kappa Phi.

The Phi Kappa Phi Prize for the sophomore student having the highest scholarship record for the college year 1925-26, and the Sigma Xi Prize for the junior student having the highest scholarship record for the college year 1925-26, were awarded to Walter H. Chivers and Harold J. Classick, respectively.

†See editorial, "Something Worthwhile," in the JOURNAL for July, 1927, p. 413.

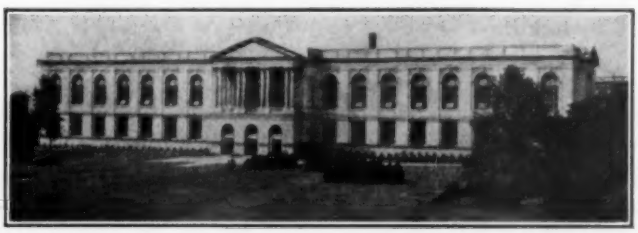
Meet me where Penn met the Indians—
Philadelphia—September 13-14-15-16

GEORGIA STATE COLLEGE OF AGRICULTURE

The commencement exercises of the Georgia State College of Agriculture were held June 15, 1927. In the Division of Veterinary Medicine, degrees were conferred upon two members of the graduating class, as follows:

Richard David Carr Joe Leon Johnston

Attend the meeting in Philadelphia,
September 13-14-15-16,
Where many things began and the best continue



Commercial Museum, Philadelphia.

AMERICAN VETERINARY MEDICAL ASSOCIATION

Minutes of the Meeting of the Executive Board, Chicago, Ill., December 1, 1926

The semi-annual meeting of the Executive Board of the American Veterinary Medical Association convened in Room 103, La Salle Hotel, Chicago, Ill., December 1, 1926, at 7:45 p. m.

Members present: Dr. C. Way, chairman; Dr. George Hilton, District No. 1; Dr. T. E. Munce, District No. 2; Dr. C. H. Stange, District No. 5; Dr. Geo. H. Hart, District No. 6; President Sigler, Treasurer Jacob, Secretary-Editor Hoskins and Dr. Louis A. Klein.

The first question considered was the selection of dates for the Philadelphia meeting. Dr. Klein, representing the Local Committee on Arrangements, suggested that the meeting be held either September 13-16, or the corresponding days of the week following. After considerable discussion, it was moved by Dr. Munce, seconded by Dr. Stange, that the meeting dates be Tuesday to Friday, September 13-14-15-16, 1927. The motion was carried unanimously.

Upon the recommendation of the Local Committee, the Bellevue-Stratford Hotel was designated as the official headquarters for the convention.

The Secretary directed attention to the fact that it might be desirable to discontinue the general mailing of copies of the program of the convention to all members of the Association, as in years past. He pointed out that this had been possible heretofore at practically no cost for postage, in view of the fact that it had been customary to mail these programs with the notices for dues for the ensuing year. With the change in the Association year, the notices for dues are now sent out during the month of October. The mailing of copies of the program of the meeting to be held in September would necessitate an extra mailing for the purpose. The Secretary pointed out that the program in full would be published in the September issue of the JOURNAL for the benefit of the membership at large. This could be reprinted at a very slight cost and this reprint could serve as the official program for use at the meeting. After thorough consideration of the matter, it was decided to discontinue the printing of a special program for general mailing and the Secretary was instructed to make an announce-

ment to this effect in the JOURNAL, prior to the convention. (Any member of the Association who desires to secure a copy of the program should request a copy from the Secretary.)

The discussion then turned to a consideration of the outline of the program for the Philadelphia meeting. This was studied very carefully and the following general arrangement was agreed upon tentatively:

	MONDAY SEPT. 12	TUESDAY SEPT. 13	WEDNESDAY SEPT. 14	THURSDAY SEPT. 15	FRIDAY SEPT. 16
Morning	Meetings of Committees	Opening Session	Sectional Meetings	Sectional Meetings	Clinic
Afternoon	Meeting of Executive Board	General Session	General Session	General Session	Clinic
Evening	State Association Conference	Alumni Meetings President's Reception	Banquet	General Session —— Papers	

The Secretary reported his interview with Professor Benesch relative to the payment of his expenses in connection with his attendance at the meeting in Lexington. Professor Benesch had stated that his entire traveling expenses were being taken care of from another source and that he did not have any bill to present to the Association. After some discussion, it was moved by Dr. Munce, seconded by Dr. Hilton, that the Association tender Professor Benesch an honorarium of $100, the details for transmitting this amount to Professor Benesch to be decided by Treasurer Jacob and the Secretary.

Dean Klein then directed to the attention of the Board the status of members of the veterinary faculty at the University of Pennsylvania in regard to pensions from the Carnegie Foundation. The true state of affairs had been brought out following the death of Dr. John W. Adams recently, when it was found that members of the veterinary faculty were not provided for. After further explanation by Dean Klein and the members of the Board who were connected with other colleges, it was moved by Dr. Munce, seconded by Dr. Stange, that a committee be appointed to interview the Carnegie Pension Board and to place before them the status of teachers in veterinary colleges, and what appeared to be an unjust discrimination against members of veterinary faculties. Motion carried. President Sigler ap-

pointed the committee as follows: Chairman, Dr. John R. Mohler, Dr. W. Reid Blair and Dr. Cassius Way.

The Secretary again called attention to the fact that there was no provision for certificates of membership for honorary members. He reviewed the correspondence that had passed between himself and Dr. H. Jensen, of Kansas City. It was moved by Dr. Stange, seconded by Dr. Hilton, that a committee be appointed to bring in a recommendation to the Association at the next meeting. Dr. Way appointed the following committee: Chairman, Dr. George Hilton, Dr. T. A. Sigler and Dr. H. Preston Hoskins.

The Secretary then presented two applications for student chapters, these being from the veterinary student organizations at the Michigan State College and the State College of Washington. It was moved by Dr. Hilton, seconded by Dr. Stange, that these be approved. Carried.

Dr. Munce then drew attention, in the form of a prepared communication, to the fact that the Constitution and By-laws were in serious need of revision.

> It has been pointed out by the Secretary, as well as members of the Executive Board, that certain sections of our present Constitution and By-laws do not express clearly and definitely the scope and purpose of the A. V. M. A., and furthermore certain sections conflict with other parts of the instrument. In view of the foregoing facts it seems desirable that a careful study be given the matter of revising the Constitution and By-laws, for the purpose of correcting the conflicting sections and clarifying others. To that end I move that the chairman of the Executive Board be authorized to appoint a committee to study the Constitution and By-laws for the Board and to report their recommendations to the Executive Board at the Philadelphia meeting.

The motion was seconded by Dr. Hilton. After a thorough discussion of some of the points involved, the motion was carried. Dr. Way appointed the committee as follows: Chairman, Dr. T. E. Munce, Dr. C. H. Stange, Dr. E. R. Steel, Dr. L. A. Merillat and Dr. H. Preston Hoskins.

The Secretary then reported the amendments that had been offered at the meeting in Lexington. These were referred to the committee authorized to revise the Constitution and By-laws.

Dr. Stange then reported for the committee of the Executive Board that had been appointed to study the question of revising the Code of Ethics. The report was referred to the Committee on Revision of Constitution and By-laws.

The Secretary then directed attention to the fact that no definite action had been taken on the Salmon Memorial Fund.

After thoroughly considering several suggestions from the Committee appointed to study the question, it was decided to recommend that the income of the Fund be made available to some sophomore veterinary student, at the beginning of his junior year. The student to whom the award would be made would at that time be half-way through his college course and would receive the income from the Fund for the period of the final two years of his course.

The Secretary reported that several members had written him suggesting that some change be made in the design of the A. V. M. A. automobile emblem. In view of the fact that these suggestions were so divergent and that it would be such a difficult matter to harmonize them, it was decided to let the matter rest for the time being.

The Secretary then directed attention to the fact that nothing definite had been done with regard to the resolution introduced by the Policy Committee at the meeting in Lexington. A very thorough discussion followed, but no definite action was taken.

H. Preston Hoskins,
Secretary.

AN INVITATION

I wonder how many of the ladies expect to attend the meeting of the A. V. M. A., September 13-16, 1927.

Those who do should remember we have a real live Women's Auxiliary, which not only helps us to get better acquainted but it is an organization that is accomplishing something as well.

Come and see what we are doing. We need your assistance.

Mrs. A. T. Kinsley.

Academy of Music, Philadelphia.

ASSOCIATION MEETINGS

MASSACHUSETTS VETERINARY ASSOCIATION

The annual meeting of the Massachusetts Veterinary Association was held at the Chamber of Commerce, Boston, April 27, 1927. A banquet was served at 6:30, there being about fifty members and visitors present. The meeting was presided over by the President, Dr. E. A. Crossman. Following the banquet a short business session was held, at which annual reports were submitted. Officers for the year were elected as follows: President, Dr. Chas. Winslow, Rockland; first vice-president, Dr. E. A. de Varennes, Quincy; second vice-president, Dr. J. K. Mason, Campello; secretary-treasurer, Dr. H. W. Jakeman, Boston.

The retiring President, Dr. E. A. Crossman, gave a very interesting résumé of the activities of the Association during the year. He briefly outlined the various meetings held and pointed out that no member of the profession could afford to be absent from the Association meetings.

The President next called upon the guest of the evening, Dr. J. A. Kiernan, Chief, Division of Tuberculosis Eradication, U. S. Bureau of Animal Industry. Dr. Kiernan briefly discussed a bill which provides for indemnity for cattle slaughtered because of Johne's disease and said that such a bill had been passed by Congress. He also discussed the various tests for this disease and stated that there now exists a reliable johnin for diagnostic purposes. Dr. Kiernan spoke of the shortage of veterinarians in the U. S. Bureau of Animal Industry, but felt that, with the probable increase of salaries for men in federal service, there would be an adjustment in the supply and demand within the next few years. He was very optimistic about the future of the veterinary profession.

The President next called upon Dr. Langdon Frothingham, who had worked with Johne, in Dresden, Germany, and had materially assisted in discovering the cause of Johne's disease. Dr. Frothingham, in a very interesting manner, outlined the way in which this discovery came about. Specimens of intestines received at Johne's laboratory were handed over to Dr. Frothingham for bacteriological examination. The first smear made showed the field to contain a great many acid-fast bacilli, stained

with the tubercle bacillus stain. When these were shown to Dr. Johne, he thought a mistake had been made, but finally suspected an infection with avian tubercle bacilli. The material was taken by Dr. Frothingham to the celebrated Koch, in Berlin, and smears were demonstrated to him. Dr. Koch likewise thought that the infection was one of tuberculosis, probably of the avian type.

Nothing was heard of this disease for about ten years, after which investigators in Holland encountered the same condition and referred to the earlier works of Johne and Frothingham. Almost every year since, this condition has been reported. Some five or six years ago, it was reported in Africa. In the meantime, several cases were encountered in this country. Just recently Dr. Frothingham received a reprint from Copenhagen, describing a mixed infection with the avian and bovine types of the tubercle bacillus. This possibility was suggested some thirty years ago and, in Dr. Frothingham's opinion, a lot of so-called Johne's disease in cattle may be tuberculosis of the avian type.

Other speakers who were called upon by the President were Drs. L. H. Howard, E. W. Babson, H. W. Pierce and M. J. Curran.

H. W. JAKEMAN, *Secretary.*

Meet me where Penn met the Indians—
Philadelphia—September 13-14-15-16

CENTRAL NEW YORK VETERINARY MEDICAL ASSOCIATION

The eighteenth annual meeting of the Central New York Veterinary Medical Association was held at Seneca, Falls N. Y., June 8, 1927.

The meeting opened with a clinic, held at the veterinary hospital of Dr. W. L. Clark. The following cases were presented:

Brown gelding. Teeth floated, by Dr. C. R. Baldwin.

Pure-bred Guernsey cow for examination. Reported to have suddenly dropped off in her milk-flow. The urine was of a high specific gravity. She was practically blind. The consensus of opinion was that the condition was probably due to some reflex nervous condition, presumably caused by some toxic irritant. The cow appeared to be improving.

Dog. Tumor of the membrana nictitans, removed by Dr. J. H. Stack.

Dog with broken leg. Resplinted by Drs. J. H. Stack and C. R. Baldwin.

Three pigs, all ruptured on the left side. Operated upon by Drs. J. H. Stack, W. L. Long and others.

Pure-bred Guernsey cow for examination. This revealed cystic ovaries.

Following the clinic, lunch was served at the Elks' Club Room. At 2:00 p. m., the meeting was called to order for a business session and the literary program. Dr. J. B. Knapp presided. The minutes of the previous meeting were read and approved. The report of the Treasurer was presented, referred to the Auditing Committee and later approved and ordered placed on file. Roll-call showed seventeen veterinarians and visitors in attendance.

Dr. J. A. Pendergast was made a life member of the Association. This action was taken on account of the fact that Dr. Pendergast has been incapacitated for practice by illness for quite a while and the members desired to show their appreciation of his past services to the organization in some way. Dr. J. B. McGuire, of Geneva, was admitted to membership.

Election of officers resulted as follows: President, Dr. J. C. Stevens, Cortland; vice-president, Dr. C. R. Baldwin, Fulton; secretary-treasurer, Dr. W. B. Switzer, Oswego.

Interesting case reports were presented by Drs. J. K. Bosshart, C. R. Baldwin and J. M. Currie. All of these brought out good discussions and at 5:30 p. m. the session adjourned to the Hotel Gould, where a very fine fish dinner was served. Here the veterinarians were joined by the ladies. Just before adjournment, a rising vote of thanks was tendered Dr. W. L. Clark for the hospitality extended and for his untiring efforts to make this meeting a success. Thus closed one of the banner meetings of the Association.

W. B. SWITZER, *Secretary.*

Thee and thine to the City of Penn;
Forget not when—September 13-14-15-16

CALIFORNIA STATE VETERINARY MEDICAL ASSOCIATION

The annual meeting of the California State Veterinary Medical Association was held in the new Municipal Auditorium in Sacra-

mento, June 13, 14, 15, 1927. Approximately one hundred veterinarians, including Dr. P. H. Browning, now Territorial Veterinarian of Hawaii, attended the meeting. A feeling of optimism for the future pervaded the session, due in part to the enactment of two laws pertaining vitally to the practice of veterinary medicine in the state of California. These laws, known as the Practice Act and the Bovine Tuberculosis Law, passed by the last session of the legislature and made effective by Governor Young's signature, represent distinct progress in the profession. The Practice Act is one which has "teeth" in it for dealing with the "quack" problem. The Bovine Tuberculosis Law restricts the sale and use of tuberculin to licensed veterinarians and also makes imperative the branding of reactors.

Mr. G. H. Hecke, Director of the State Department of Agriculture, in his address stressed the value of the new Tuberculosis Law, and urged a close cooperation between the State Department and practicing veterinarians toward rigid enforcement.

Dr. Robert Jay, B. A. I. Inspector, pointed out the relation of improper feeding to the inducement of paratyphosis in pigs. His differential diagnosis of paratyphus infection and hog cholera brought out many detailed points in this connection and Dr. Jay at the same time minimized the importance of hemorrhagic septicemia in swine as a primary disease.

The afternoon of the first day was devoted largely to a discussion of subjects pertaining to tuberculosis. In an excellent paper, Dr. J. P. Iverson, Chief of the Bureau of Animal Industry of the State Department of Agriculture, discussed the Bovine Tuberculosis Law, at the same time answering many questions relative to its enforcement. Mr. T. H. Christiansen, Deputy Attorney General, presented the legal features of both the Practice Act and the Tuberculosis Law. Mr. Christiansen, in a clear and concise manner, answered numerous queries on these laws and stated that in his opinion both acts were very sound legally.

Dr. George H. Hart, who was given an ovation upon his appearance following serious injuries in an automobile accident last winter, discussed "Nutritional Diseases of Live Stock," and told of the appearance in a California herd of cattle of a disease resembling closely the condition known as "lamziekte" in South Africa, but which differed in the absence of the toxin-producing anaerobe characteristic of "lamziekte."

Dr. O. A. Longley demonstrated the practicability of common gummed strip paper as a cast for fractures in small animals. Its lightness, ease of application and efficiency make it much more desirable as cast material than some of the heavier materials now in use.

A demonstration of the value of the fetotome in embryotomies was given by Dr. D. F. Fox. The simplicity of the instrument, diminution of danger to the dam, and rapidity of operation were brought out as features of the instrument.

The existence of anaplasmosis in this state has been definitely demonstrated, and the illustrated lecture on the disease by Dr. W. H. Boynton gave to the audience an excellent summary of the condition, including symptomatology and diagnosis.

A symposium on the report of the Policy Committee occupied practically all of the morning of the second day. This symposium was opened with a paper on "Veterinary Charges," by Dr. W. L. Edwards, followed by the report of the Policy Committee, with an ensuing discussion by many of the audience. The idea appeared to be prevalent that the veterinary profession is too modest about allowing the world to know of its accomplishments. There was also the idea that we can do much favorable advertising by caring for personal appearance, proper equipment, interest in civic affairs and certainly by endeavoring to render a still more efficient service. It was suggested that the dues of Association membership be raised sufficiently to make funds available for maintaining a secretary on full salary, who should act as a personal contact unit between the profession and the interests served. It was believed by some that the employment of such an official would not only strengthen the Association and directly the profession, but would also enable the veterinarians to have a spokesman on duty at all times when the well-being of the profession was involved. The discussion was filled with pertinent suggestions relative to the welfare of the veterinary profession and resulted in the appointment of a committee to revise the by-laws of the Association so as to make operable some of the suggestions arising in the symposium.

On the afternoon of the second day a drive was made through the territory surrounding Sacramento, and many points of interest were visited. The annual banquet was held in the evening at the Sacramento Hotel. One hundred and twenty-five were in attendance and the affair was pronounced one of the most successful which the Association has ever sponsored.

The subject of anthrax and its control occupied practically all of the morning of the last day. A paper by Dr. C. E. Salsbery, on "Methods of Anthrax Immunization," was read in which data resulting from the field use of anthrax aggressin were presented. Dr. R. A. Caldwell gave a paper on "Field Observations in Anthrax." A considerable part of Dr. Caldwell's practice is devoted to the handling of anthrax, and his talk was filled with his observations and methods. His was undoubtedly one of the most instructive papers given during the meeting. Dr. W. H. Busher, another practitioner who deals with much anthrax, gave a summary of his methods and results in handling the disease. These papers were followed by a general discussion, during which the importance was stressed of securing not only an early but a correct diagnosis in order that the disease may be dealt with favorably. It was the opinion of those who had tried out the Ascoli test that it was not a practicable test for field use.

Dr. F. H. McNair read a paper on "Children's Pet Shows as Related to Child Psychology," in which the benefits of children having pets was pointed out. This paper brought out points not usually thought of in this connection and caused much favorable comment.

Dr. E. H. Barger reported the existence of *Ostertagia ostertagi* in California, together with the apparently favorable results obtained in this outbreak by the use of copper sulphate.

County ordinances on tuberculosis control were discussed by Dr. L. M. Hurt, and the need of strict enforcement of the Tuberculosis Law was pointed out.

The annual election of officers resulted as follows: President, Dr. J. P. Iverson, Sacramento; vice-president, Dr. E. H. Barger, Davis; secretary, Dr. W. L. Curtis, Los Angeles; treasurer, Dr. D. F. Fox, Sacramento.

E. H. BARGER, *Secretary.*

Attend the meeting in Philadelphia,
September 13-14-15-16,
Where many things began and the best continue

STATE VETERINARY MEDICAL ASSOCIATION OF TEXAS

The seventh annual meeting of the State Veterinary Medical Association of Texas and the fifth annual short course for graduate veterinarians, held at the A. and M. College, College Station,

June 13-18, 1927, brought about seventy-five doctors of veterinary medicine from over the State and graduate students in considerable numbers. Many were accompanied by their wives.

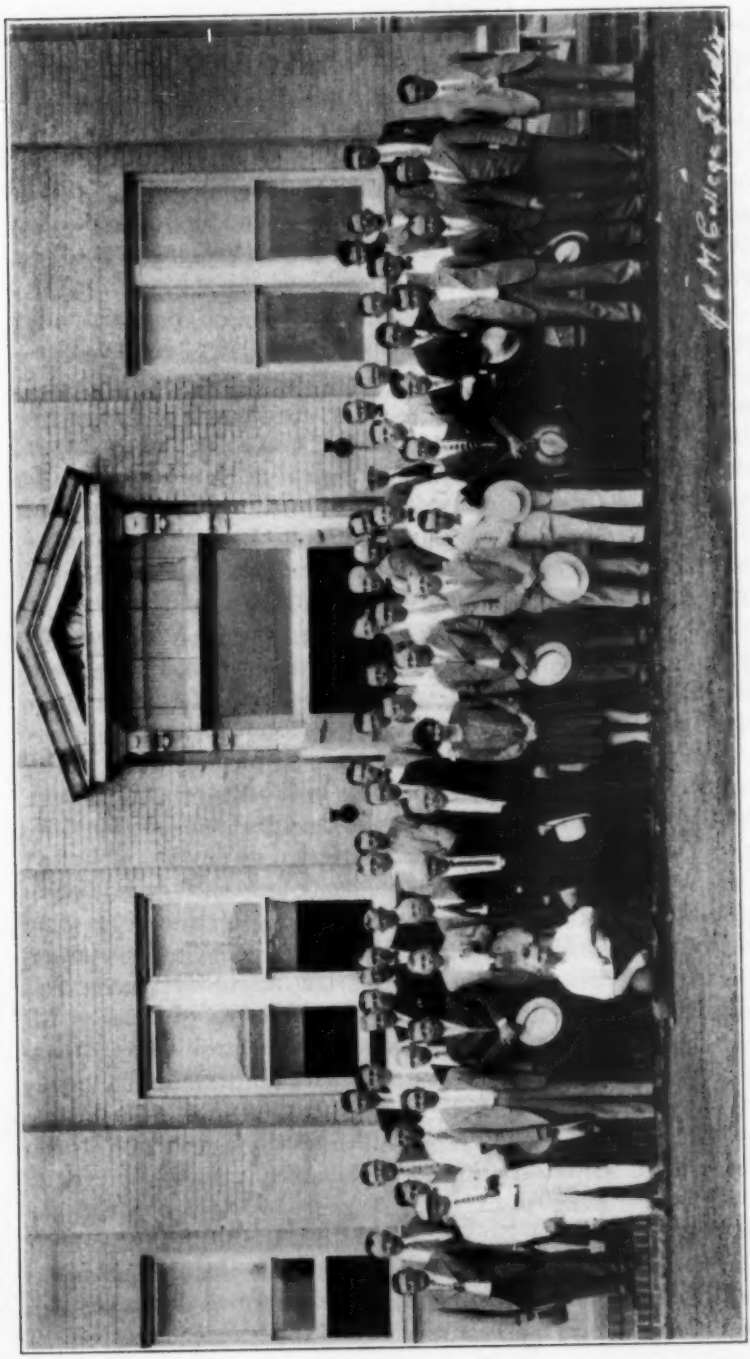
The short course opened Tuesday morning; Dean Mark Francis, of the School of Veterinary Medicine, outlining the course. Dr. U. E. Marney, of San Antonio, president of the Association, delivered his annual address and presided at the business and executive session held Tuesday evening. The following officers were elected during the business session: Dr. M. E. Maier, Orange, president; Dr. M. E. Gleason, San Antonio, first vice-president; Dr. Y. J. Aiken, Granbury, second vice-president; and Dr. D. Pearce, Leonard, re-elected secretary and treasurer.

Dr. Dudley Jackson, of San Antonio, spoke Tuesday night on snake venom and its antidotes, illustrating his lecture with pictures of victims and experiment animals. Dogs fill a rôle of importance to industry, particularly in Europe and also in America as well, and that of companion to man, Dr. J. G. Horning, of Houston, specialist in the diseases and surgery of small animals, pointed out in a lecture delivered Wednesday afternoon. Dr. Horning spent several months in Europe last year, studying the management and equipment of small animal hospitals there.

Other lecturers, Wednesday afternoon, included Dr. J. S. Grove, in charge of meat inspection work, Bureau of Animal Industry, Fort Worth, who discussed lessons from postmortem work. Dr. Grove dealt with the protection given the public by the inspection of meats and pointed out how such work keeps the stockmen informed about the presence of disease in the herds and flocks before such diseases reach the incurable stages.

Dr. N. F. Williams, state veterinarian, discussed the service rendered by the Live Stock Sanitary Commission of Texas. All means possible are being taken, he said, to control diseases that exist and extraordinary measures are taken to prevent the introduction of dangerous diseases from other countries. The Commission has in its employ eight veterinarians who give their entire time to the latest and most economical means of preventing and controlling diseases of Texas live stock, valued at $350,000,000.00.

Dr. F. B. Green, veterinarian to the State Board of Health, discussed the efforts made by the State Board in obtaining the inauguration of ordinances, especially in the smaller cities where



Group picture taken at the seventh annual meeting of the State Veterinary Medical Association of Texas, College Station, June 13-18, 1927

conditions need improvement, safeguarding meat inspection and health conditions.

Dr. W. G. Gregory, member of the Committee on Legislation, talked on legislative activities of the organization.

Dean Mark Francis, of the School of Veterinary Medicine of the A. and M. College, under the auspices of which the short course was conducted, delivered a lecture on the fossils of prehistoric animals found in Texas, especially horses. At the Tuesday morning session, Dr. Charles E. Salsbery, of Jensen-Salsbery Laboratories, Kansas City, Mo., discussed rabies and new methods of inoculation of canines against this disease. "Feeding and Management of Small Animals" was discussed by Dr. E. L. Quitman, specialist in diseases and surgery of small animals, Chicago, Ill.

A barbecue was held, Wednesday evening, in front of the School of Veterinary Medicine for those attending the short course. Wednesday afternoon, a social affair for the members of the Ladies' Auxiliary to the State Veterinary Medical Association of Texas was held at the residence of Dr. and Mrs. R. P. Marsteller, on the lawn. Thursday evening, a party for the ladies and gentlemen was held on the residence lawn of Dean and Mrs. Mark Francis. Laying aside the important affairs of the day, a good time and much hilarity was had playing old-fashioned games. Delicious refreshments were served to sixty-five guests.

Election of officers for the Ladies' Auxiliary resulted in the selection of the following: Mrs. U. E. Marney, San Antonio, president; Mrs. R. P. Marsteller, College Station, first vice-president; Mrs. L. E. Warner, Dallas, second vice-president; Mrs. W. R. Sanderson, Brownwood, corresponding secretary; and Mrs. D. Pearce, Leonard, secretary and treasurer.

Thursday afternoon, Dr. W. G. Brock, of Dallas, demonstrated surgery of the stomach and intestines. Dr. H. E. Bemis, Iowa State College, Ames, Iowa, discussed surgery of the reproductive organs of large animals, giving special attention to spinal anesthesia, as used in the treatment of sterility of cattle. Dr. Bemis, it was learned, is to go to the University of Pennsylvania, as Professor of Veterinary Surgery, to succeed Dr. John W. Adams, who died last year. Diseases and surgery of small animals were also discussed in a clinic conducted by Drs. Bemis and Quitman.

Veterinarians and others here for the short course and the other sessions describe the short course this year as one of the

most successful ever held, both in point of discussion and interest manifested. Dean Mark Francis, Dr. R. P. Marsteller, Dr. A. A. Lenert, Dr. R. C. Dunn, and others of the staff put in a busy period in directing the work, but declare themselves well pleased with the progress of the work and the interest in the veterinary profession in Texas. The profession owes much to Dr. T. O. Walton, president of the College, for the benefit resulting from the short course and the members of the Association freely expressed themselves by thanks and praise for this privilege given them.

The final event of the program was a watermelon party and dance, Friday night, at Francis Hall. In the afternoon, a party was given at the residence of Dr. and Mrs. A. A. Lenert, for the members of the Ladies' Auxiliary.

D. PEARCE, *Secretary.*

See Philadelphia—September 13-14-15-16.
Rich in History; active in Industry;
Renowned in Medical Science

NORTHEASTERN INDIANA VETERINARY MEDICAL ASSOCIATION

The sixth annual picnic of the Northeastern Indiana Veterinary Medical Association was held at the cottage of Dr. Roy Clark, at Tri-Lake, June 9, 1927. The occasion marked the birthday anniversary of Dr. Clark. Among those present were Dr. T. A. Sigler, of Greencastle; Dr. L. A. Merillat, of Chicago; Dr. F. H. Brown and Dr. R. C. Julien, of Indianapolis. Officers were elected as follows: President, Dr. S. D. Wiles, Fort Wayne; secretary-treasurer, Dr. C. E. Haflick, Markle.

Meet thy friends in the Friendly City—
Philadelphia, September 13-14-15-16

INDIANA-ILLINOIS VETERINARY MEDICAL ASSOCIATION

An all-day meeting of the Indiana-Illinois Veterinary Medical Association was held at Sullivan, Ind., June 17, 1927. A fish fry and picnic dinner featured the program. Dr. W. J. Ridgway, of Robinson, Ill., is president and Dr. Frank M. Tade, of Vincennes, Ind., is secretary of this live organization.

WABASH VALLEY VETERINARY ASSOCIATION

The regular bi-monthly meeting of the Wabash Valley Veterinary Association was held at Wabash, Ind., June 23, 1927. Dr. F. H. Brown, state veterinarian, delivered the principal address, on the subject of "Poultry Diseases."

Meet thy friends in the Friendly City—
Philadelphia, September 13-14-15-16

NORTHWESTERN INDIANA VETERINARY ASSOCIATION

The annual dinner meeting of the Northwestern Indiana Veterinary Association was held at Playland Park, South Bend, June 23, 1927. Dr. Link Grigsby, of Walkerton, was elected secretary-treasurer of the organization.

Meet me where the Continental Congress met;
Sign where the Declaration of Independence was signed—
In Philadelphia. September 13-14-15-16

VERMONT VETERINARY MEDICAL ASSOCIATION

The nineteenth annual meeting of the Vermont Veterinary Medical Association was held at Hall's Lake and Wells River, June 28-29. The meeting started at one o'clock, Tuesday, at the camp of Dr. John Thomas, at Hall's Lake, with a buffet lunch served to about forty, after which the ladies took taxis and made the trip to Lost River, New Hampshire, which was much enjoyed by all.

At two o'clock the Association convened for various items of business. Officers were elected as follows: President, Dr. R. C. Goss, Middlebury; vice-presidents, Dr. W. C. Pulsifer, Woodstock, and Dr. H. S. Perley, Hanover, N. H.; secretary and treasurer, Dr. G. N. Welch, Northfield. Two new members were taken into the Association at this time: Drs. A. D. Spooner, Barre, and L. R. Haubrick, Claremont. Papers were read by Dr. E. H. Bancroft, of Barre, on "Rabies," and Dr. Robert Weir, of Rutland, on "Organization." These papers were interesting, and general and lengthy discussions followed.

At 7:30, at Wells River, the veterinarians and their wives sat down to a turkey banquet with all the fixings, which was served by the ladies of the Congregational Church. The banquet was

one of the best and ample justice was done, after which impromptu speeches were in order, under the guiding hand of our genial friend, Dr. George Stephens.

At nine o'clock, Wednesday morning, all assembled at Dr. Thomas' hospital for clinics, among which the following were done: Ovariotomy on two valuable draft mares, by Dr. John Thomas; roaring operation on two draft horses, by Drs. E. H. Bancroft and E. L. Miller; removal of a large carcinoma from the eye of a Holstein cow; also dental, sterility and foot operations, and numerous operations on dogs, performed by the different veterinarians. This work lasted until five o'clock, when the last members started on the long "trek" homeward, bringing to a close one of the most instructive, as well as enjoyable, meetings this Association has ever held.

The success of the meeting was in a large measure due to the great amount of work put into it by the host and hostess, Dr. and Mrs. John Thomas.

G. N. WELCH, *Sec.-Treas.*

Attend the meeting in Philadelphia,
September 13-14-15-16,
Where many things began and the best continue

MICHIGAN STATE VETERINARY MEDICAL ASSOCIATION

The forty-fifth annual meeting of the Michigan State Veterinary Medical Association was held in the Union Building, Michigan State College, East Lansing, June 28-29, 1927. An average attendance of over one hundred was present at the three sessions. An unusual number of veterinarians from outside the State had been attracted to Lansing on account of the Lake States Tuberculosis Eradication Conference, which preceded the meeting.

The address of welcome was delivered by Professor John Phelan, dean of Michigan State College. The response was made by Dr. H. Preston Hoskins, secretary of the American Veterinary Medical Association.

A brief business session preceded the presentation of papers. Reports were received from the Board of Directors and the officers.

The first address was by Dr. W. J. Fretz, B. A. I. inspector-in-charge of tuberculosis eradication in Minnesota. His subject was "Standardization of Intradermic Reactions." Dr. Fretz

explained in detail a new method for measuring and recording swellings obtained in the intradermal test. The subject was discussed by Dr. H. M. O'Rear, of Nashville, Tenn., and Dr. T. M. Bayler, of Bloomington, Ill.

Dr. H. M. Newton, B. A. I. inspector-in-charge of tuberculosis eradication in West Virginia, then gave a talk, entitled, "Contrasting Michigan and West Virginia with Regard to Tuberculosis Eradication and Hog Cholera Control." Dr. Newton, prior to going to West Virginia, spent a number of years in Michigan and, on account of the great differences of the two states, topographically and otherwise, his comparison of conditions in the two states from the standpoint of animal disease control proved to be very intersting.

A discussion of dairy cattle practice was then given by Dr. C. H. Case, well-known practitioner of Akron, Ohio. This was enjoyed by all present and was followed by a very interesting discussion of numerous points raised by Dr. Case in his talk.

The evening was spent dancing by the members, many of whom were accompanied by their wives. Cards and music provided entertainment for those who did not care to dance.

The program was continued, Wednesday morning, with an address by Professor E. F. Woodcock, of the Department of Botany, Michigan State College, on "Plants of Michigan Poisonout to Live Stock." This was illustrated with specimens of the various plants upon which Professor Woodcock spoke. He explained how each one could be identified, as well as the symptoms produced in animals when these plants were ingested.

Dr. B. A. Perry, of Hastings, spoke on "Our Practice Act." Discussion was opened by Dr. H. Preston Hoskins, of Detroit, who reported on legislative activities in a number of states, during the past winter. He dwelt at some length upon the new Veterinary Practice Act of Oregon, which embodies a number of features not to be found in any other veterinary practice act in the country. Dr. Hoskins also dwelt at some length on the efforts which had been made to defeat pending veterinary legislation in several of the states, this opposition having originated with interests inimical to the veterinary profession. It was made plain that veterinarians henceforth would have to be on their guard and protect themselves against further encroachments by these interests.

Dr. Case then continued his duscussion of dairy practice. He demonstrated his teat operations and the instruments used by

him. One can not listen to Dr. Case very long without realizing that he is listening to a man who thoroughly understands his subject. The Michigan veterinarians appreciate very much the opportunity and the pleasure they had as a result of his presence at this meeting.

The subject of "Skin Diseases of Small Animals and Methods of Treatment" was very ably presented in a paper by Dr. L. H. LaFond, of Flint. He took up the various diseases in a systematic manner, described the symptoms and gave what had proved to be the most successful treatment for each condition in his experience.

Dr. J. M. Timms, of Hudson, concluded the literary part of the program with a paper, entitled, "Professional Ethics." This was an excellently prepared paper and contained a great deal of food for thought. Dr. Timms very well brought out the obligations assumed by the veterinarian in his relations with all persons with whom he comes in contact.

Election of officers resulted as follows: President, Dr. L. A. Wileden, Mason; first vice-president, Dr. W. N. Armstrong, Concord; second vice-president, Dr. J. A. Schaefer, Bangor; third vice-president, Dr. E. B. Cavell, Northville; secretary and treasurer, Dr. E. K. Sales, East Lansing; member of the Board of Directors, Dr. G. D. Gibson, Adrian.

For the Committee on Intelligence and Education, Dr. H. Preston Hoskins, chairman, presented a report, dealing with legislation affecting the veterinary profession and matters pertaining to veterinary education. For the Committee on Legislation, Dr. A. McKercher, chairman, reported that only one bill affecting the veterinary profession had been introduced at the recent session of the Michigan Legislature. This was a bill to regulate the charges to be made by veterinarians for performing tuberculin tests. The bill failed to pass. For the Finance Committee, Dr. J. S. Donald, chairman, reported that the books and accounts of the Secretary-Treasurer had been audited and found correct. For the Committee on Resolutions, Dr. B. A. Perry, chairman, reported the deaths of four members of the Association, during the past year and a suitable resolution covering these deaths was adopted.

The Association went on record as favoring Minneapolis as the convention city of the American Veterinary Medical Association for 1928 and also decided to extend an invitation to the

A. V. M. A. to meet in Detroit as the guests of the profession in Michigan in 1929.

E. K. SALES, *Secretary.*

LAKE STATES TUBERCULOSIS ERADICATION CONFERENCE

The third Lake States Tuberculosis Eradication Conference was held at the Olds Hotel, Lansing, Michigan, June 27-28, 1927. The participants in the Conference came from the states of West Virginia, Tennessee, Kentucky, Ohio, Indiana, Illinois, Minnesota, Wisconsin and Michigan.

Mr. H. W. Norton, Jr., Director, Bureau of Animal Industry, Michigan Department of Agriculture, opened the meeting as presiding officer on Monday morning, June 27, and immediately called upon Dr. A. J. Barnes, Assistant Inspector-in-Charge for Kentucky, to present his paper on "Organization of Counties for Tuberculosis Eradication Work." The discussion of this subject was opened by Dr. C. A. Thomas, county veterinarian, Michigan.

"The Use of Accredited Veterinarians in Area Work," the subject assigned to Dr. E. S. Augsburger, federal veterinarian, Ohio, was ably presented. Dr. C. C. Dobson, state field veterinarian, Indiana, gave a very fitting discussion of the paper. Dr. John T. Shelton, federal veterinarian, Illinois, followed with some very well-timed remarks on "The Importance of Cleaning and Disinfection." The discussion which followed was led by Dr. E. V. Alexander, federal veterinarian, Indiana, and Dr. S. G. Colby, county veterinarian, Michigan.

The next subject, relating to "The Handling and Disposing of Reactor Cattle," was reviewed in a splendid and thorough manner by Dr. E. P. Schaffter, B. A. I. Inspector-in-Charge, Detroit. This paper was the subject of a very gratifying discussion by Dr. J. S. Healy, Inspector-in-Charge, Wisconsin, and Dr. J. E. Gibson, Inspector-in-Charge, Indiana. (Published in this issue of the JOURNAL.) The morning session was closed by Dr. A. E. Wight, Assistant Chief, Tuberculosis Eradication Division, Bureau of Animal Industry, Washington, D. C., with the presentation of some very interesting facts and figures relating to salvage and indemnity.

The afternoon session was marked by a dual arrangement relating to the presiding officers, Dr. Don Griswold, Assistant Commissioner, Michigan Department of Health, and Dr. T. S. Rich, Inspector-in-Charge for Michigan, presiding. The session

was opened by Dr. J. B. Current, federal veterinarian, Indiana, with a paper on "Branding, Tagging and Identifying Reactors." The leader in the discussion was Dr. W. R. Winner, federal veterinarian, Wisconsin. Dr. J. A. Kiernan, Chief, Tuberculosis Eradication Division, B. A. I., next appeared and in his customary manner gave a very clear and comprehensive report of "The Results of Ten Years' Effort in Eradicating Tuberculosis."

Dr. Max Penner, of the Detroit Municipal Tuberculosis Sanatorium, Northville, followed with the subject of "Relation of Animal Tuberculosis to Human Tuberculosis." This was a splendid presentation and aroused considerable discussion. Dr. Penner was called upon to answer a number of pertinent questions. Mr. A. J. Glover, editor of Hoard's Dairyman, in his usual, forcible and efficient manner, continued the program with the subject of "Viewing the Eradication Campaign Through the Dairyman's Glasses." Needless to say, Mr. Glover presented plenty of material for thought.

Dr. Ward Giltner, Dean, Division Veterinary Science, Michigan State College, gave a characteristic discussion of the question "Is There a Dipteron in the Ointment?" Dr. Giltner's remarks were well received and appreciated. (Published in this issue of the JOURNAL). Mr. H. W. Wigman, of Lansing, who has had a vast experience as a cattle dealer and owner, followed Dr. Giltner, with an elaboration of the question, "How About the Cattle Dealer?" In view of the attitude of some cattle dealers, Mr. Wigman's remarks were indeed refreshing.

The concluding subject on the afternoon program was "Dealing with the Obstructionist, Individually and Collectively." This was presented in an able manner by Dr. G. H. Gordon, county veterinarian, Michigan, and discussed by Drs. B. H. Borman, federal veterinarian, Wisconsin; L. L. Criswell, federal veterinarian, Indiana, and H. A. Dennewitz, county veterinarian, Ohio.

The Monday evening session was in the form of a banquet served in the Wisteria Room of the Olds Hotel. Mr. Herbert E. Powell, Commissioner of Agriculture of Michigan, presided. Dr. James S. Healy, Inspector-in-Charge, Wisconsin, responded to the address of welcome.

A humorous discussion of "The Model Cow" was given by Mr. James Hays, Field Secretary, Michigan Holstein-Friesian Association. Mr. Hays' remarks were highly entertaining and through contrast conveyed a worthwhile message.

Mr. M. L. Noon, president of the Michigan State Farm Bureau, followed Mr. Hays with a splendid address on "Dollars and Sense in Tuberculosis Eradication." Mr. Noon left no doubt as to his position or the attitude of the State Farm Bureau so far as tuberculosis eradication is concerned.

The program for the evening was concluded by a talk on "Trials of a Tuberculin Tester," by Dr. N. H. Howlett, federal veterinarian, Michigan. Dr. Howlett was frequently and forcibly interrupted by Drs. G. H. Gordon and John Winter, of the Michigan force, who, under the pretense that they were farmers and cattle owners, presented a number of amusing questions and arguments.

The Tuesday morning session was called to order promptly by Dr. J. A. Kiernan, who immediately called upon Dr. C. H. Casé, practitioner, Akron, Ohio, to tell about ""The Relation of the Practitioner to the Tuberculosis Eradication Campaign." Dr. Case responded in an able and pleasing manner.

"Avian Tuberculosis" next attained the position of interest and was discussed at some length. The symposium was opened by Dr. Alvin Broerman, from the Ohio Department of Agriculture Laboratory, Reynoldsburg, who was followed by Dr. Elmer Lash, Bureau of Animal Industry, Washington, D. C. Professor H. R. Smith, live stock commissioner, Chicago, succeeded Dr. Lash with a timely discussion on "The Relation of Avian Tuberculosis to Hogs from Accredited Areas."

At the conclusion of the discussion of avian tuberculosis, Mr. C. L. Cuff, live stock commissioner, Kansas City, gave a very practical talk on "The Methods of Identifying Hogs After Slaughter," and demonstrated that the tattoo, properly applied, serves a very useful purpose.

The Conference proper was closed with a lively and interesting presentation of the problems relating to importing and maintaining feeding cattle in tested areas. Dr. F. A. Zimmer, State Veterinarian of Ohio, submitted a splendid paper on the topic, which was discussed by Dr. J. J. Lintner, Inspector-in-Charge, Illinois; Dr. F. H. Brown, State Veterinarian of Indiana, and Dr. V. S. Larson, State Veterinarian of Wisconsin. The Conference was then adjourned with the understanding that additional subjects of interest would be presented at the forty-fifth annual meeting of the Michigan State Veterinary Medical Association, which was to convene that afternoon, in the Union Memorial Building at the Michigan State College, East Lansing.

B. J. KILLHAM, *Reporter.*

NECROLOGY

DAVID D. ROBERTSON

Dr. David D. Robertson, of Lodi, Wisconsin, died December 20, 1926. He was born at Lodi, April 6, 1901, attended high school and Iowa State College. He took one year of agriculture at the latter institution and was graduated with the degree of D. V. M. in 1924. He joined the A. V. M. A. the same year.

WALTER PFENNIGER

Dr. Walter Pfenniger, Privatdozent and Oberassistent of the Veterinary Pathological Institute, University of Zurich, died on April 11, 1927, of liver tuberculosis, at the age of 35 years.

Doctor Pfenniger was one of the outstanding young veterinary investigators of Europe. Many American veterinarians will recall his visit to America in 1924.

R. E. WHITING

Dr. R. E. Whiting, of Ithaca, N. Y., died June 12, 1927, following an illness of two years, due to heart trouble. He was a graduate of the New York State Veterinary College at Cornell University, class of 1924. He is survived by his widow.

GEORGE H. DEAN

Dr. George H. Dean died at Tucson, Arizona, June 26, 1927, in his thirty-fifth year. He was a graduate of the Kansas State Agricultural College, class of 1916.

Shortly after graduation, Dr. Dean accepted a commission in the Army and during the World War he was advanced to the rank of major. Following the signing of the Armistice he resigned and located in Wichita, Kansas, for general practice. His health soon broke down and for several years past he had been residing in Arizona.

Burial took place, July 3, at Arkansas City, Kansas, the home of his mother.

Dr. Dean was an unusually brilliant student and made a very fine record while in college. He was a member of the Alpha Psi and Gamma Sigma Delta fraternities.

MARTIN W. SCOTT

Dr. M. W. Scott, of Vincennes, Ind., died July 15, 1927, aged 64 years. He was a graduate of the Indiana Veterinary College, class of 1900, and had been in general practice at Vincennes ever since his graduation.

Dr. Scott joined the A. V. M. A. in 1912. He was a past president of the Indiana Veterinary Medical Association and was an active worker in the Indiana-Illinois Veterinary Medical Association, of which body he was secretary for a number of years. During the World War Dr. Scott was in the government service, in connection with the purchasing of horses and mules.

The deceased is survived by his widow and two sisters.

Our sympathy goes out to Dr. and Mrs. G. S. Hopkins, of Ithaca, N. Y., in the death of their son, Stephen, at the summer home of the family, Chautauqua, N. Y., June 26, 1927.

MARRIAGES

Dr. U. G. Johnson, of Sidney, Ill., to Miss Florence McKee, of Marion, Ill., May 14, 1927.

Mr. Alfred P. Jahn, of New York City, to Miss Elinor M. Fish, daughter of Dr. and Mrs. P. A. Fish, of Ithaca, N. Y., June 24, 1927.

BIRTHS

To Dr. and Mrs. E. H. Williams, of Pawnee City, Nebr., a daughter, Jane Nettie, June 13, 1927.

To Dr. and Mrs. M. T. Jennings, of Corning, Iowa, a son, June 22, 1927.

To Dr. and Mrs. W. E. Hoot, of Colesburg, Iowa, a daughter, June 22, 1927.

To Dr. and Mrs. L. F. Barrett, of Cascade, Iowa, a son, July 4, 1927.

To Dr. and Mrs. Charles Vanderschaaf, of Avon, S. D., twin girls.

PERSONALS

Dr. W. J. Sellman (Corn. '27) has entered private practice in Utica, N. Y.

Dr. John Bacon (Corn. '26) is practicing with Dr. W. C. Marshall, Brewster, N. Y.

Dr. L. N. Peterson (Chi. '10) has removed from Vernon, Texas, to Raton, N. Mex.

Dr. R. W. Falk (Cin. '09), formerly of Cincinnati, Ohio, is now located at Hartley, Iowa.

Dr. J. B. Engle (Corn. '26) recently opened a small-animal hospital in Summit, N. J.

Dr. Clarence H. Reading (Mich. '27) has located for general practice at Hopkins, Mich.

Dr. A. H. French (Chi. '19), formerly located in Birmingham, Ala., is now in Aberdeen, Miss.

Dr. C. B. Krone (K. S. A. C. '26) gives a change of address from Auburn, Nebr., to Morrill, Kans.

Dr. W. H. Dohm (Corn. '23) is practicing with Dr. A. Slawson, 2414 Amsterdam Ave., New York City.

Dr. John LaFrance (Corn. '22) has located for practice at Binghamton, N. Y. His address is 237 Water St.

Dr. Emil Krenek (K. C. V. C. '16) has resigned his position with the B. A. I. and returned to his home in Alief, Texas.

Dr. E. R. Derflinger (O. S. U. '15), formerly of Junction City, Ore., is now located at 237 Washington St., Eugene, Ore.

Dr. A. J. Trayford (Corn. '27) has accepted a position at the State Institute of Applied Agriculture, Farmingdale, L. I., N. Y.

Dr. W. C. Bateman (Ind. '13) is now located in his new small-animal hospital at 127 Base Line, San Bernardino, Calif.

Dr. E. M. Aldrich (U. P. '13) has requested a change of address from Albany, N. Y., to 930 Bridgeman St., Elmira, N. Y.

Dr. Wellington E. Parks (Corn. '19), of Chatham, N. Y., has accepted a position with Borden's Farm Products Company, Inc.

Dr. George Gordon (Chi. '14), formerly of Gibson City, Ill., has gone to Chicago, where he plans to enter small-animal practice.

Dr. Clarence L. Campbell (O. S. U. '26), who has been located in Indianapolis, is now in Mason City, Iowa, with the Royal Serum Co.

Dr. W. C. Sprinkle (T. H. '11) has completely recovered from his recent illness and located at Martin, Tenn., for general practice.

Dr. Stanley Ferguson (Corn. '27) has entered private practice with his father, Dr. T. H. Ferguson (Ont. '96), at Lake Geneva, Wis.

Dr. B. R. Gooch (K. C. V. C. '07), formerly of Pueblo, Colo., has requested a change of address to 3219 Wayne Avenue, Kansas City, Mo.

Dr. F. A. Hall (Corn. '23) is practicing at Garrett, Ind. A considerable amount of his time is devoted to work with poultry diseases.

Dr. C. B. Skinner (Corn. '14) has sold his practice at New Berlin, N. Y., to accept a position with Borden's Farm Products Company, Inc.

Dr. C. S. Evans (Chi. '03), who has been on the staff of the B. A. I. at Buffalo, N. Y., has resigned and gone to farming at Newfame, N. Y.

Dr. C. C. Dauber (Ont. '04), of Sturgis, Mich., recently sustained a compound fracture of one leg, when a horse he was treating fell upon him.

Dr. F. P. Mathews (Colo. '23), of the veterinary staff of Purdue University, has been taking graduate work at the University of Michigan this summer.

Dr. Floyd J. Tice (Corn. '27) has accepted a position with the Pennsylvania Bureau of Animal Industry and is stationed at the laboratory in Philadelphia.

Dr. Warren Hoag (Corn. '27) has been appointed to a position in the laboratory of the Pennsylvania Bureau of Animal Industry, Philadelphia, Pa.

Dr. W. J. Embree (Chi. '10), chief veterinarian of the Western Weighing and Inspection Bureau, Chicago, spent two weeks at Fort Snelling in July.

Dr. J. R. Hoyt (Corn. '16), formerly of West Edmeston, N. Y., has purchased the practice of Dr. C. B. Skinner (Corn. '14), of New Berlin, N. Y.

Dr. Henry Van Roekel (Iowa '25) has resigned his position at the Massachusetts Agricultural College and will enter upon the study of human medicine.

Dr. James S. Marshall (Corn. '24), formerly located at the Speyer Hospital, recently announced the opening of his offices at 122 West 73rd St., New York City.

Dr. E. M. Kennelly (Corn. '26) has been pursuing graduate studies at Cornell University the past year, in preparation for the study of human medicine.

Dr. C. S. Webster (Corn. '15), formerly in the employ of the U. S. B. A. I., resigned recently to accept a position with the Dairymen's League of New York City.

Dr. M. E. Dennington (Corn. '16), of Tully, N. Y., has been appointed Onondaga County (N. Y.) Veterinarian to succeed Dr. George W. Derrick (Corn. '17).

Dr. H. P. Bonnikson (Corn. '15), who has been with the California State Department of Agriculture in Los Angeles, has been transferred to Sacramento, Calif.

Dr. Claude A. Henley (O. S. U. '25), of Jacksonville, Ill., has been appointed Sangamon County Veterinarian, succeeding Dr. N. C. Nelson, who recently resigned.

Dr. Chester M. Hamilton (Colo. '27) has accepted a fellowship in the Department of Zoology and Animal Pathology, Virginia Agricultural Experiment Station, Blacksburg.

Dr. A. A. Swaim (McK. '09) has resigned from the Bureau of Anima Industry meat inspection force in Chicago, to accept a very nice position with Wilson and Company.

Dr. R. F. Ramsey (Gr. R. '00), who has been stationed at Marshall, Mich., for three years, has been transferred to Lapeer, Mich., in connection with tuberculosis eradication work.

Dr. J. A. Munn (Ont. '07-McK. '08), of Carman, Manitoba, was elected a member of the Manitoba Legislature, June 28, as a supporter of the Government, by a majority of over 400.

Dr. N. C. Nelson (Chi. '03), who has been serving as Sangamon County (Illinois) Veterinarian since last December, has resigned his position and will return to his home in Chapin, Ill.

Dr. Hubert Shull (Ont. '16), who has been secretary of the Lions Club of Texarkana for the past six years, has been elected president of the organization, which is known as the "twin club" of Texarkana, Ark.-Tex.

Dr. Frank Thorp, Jr. (Iowa '26), has left the Virginia Polytechnic Institute, to accept a position at Michigan State College, where he will be associated with Dr. H. J. Stafseth (Mich. '17).

Dr. P. V. Howard (Mich. '22), who has been associated in practice with Dr. F. D. Egan (Ont. '23), of Detroit, Mich., accepted an appointment in the Detroit Department of Health, July 1.

Dr. Francis Falls (U. P. '06), of Uwchland, Pa., has accepted the appointment of resident surgeon at the University of Pennsylvania Veterinary Hospital, succeeding Dr. Benjamin Rau, resigned.

Dr. E. K. Sales (Mich. '16), of East Lansing, Mich., has been appointed a member of the Michigan State Board of Veterinary Medical Examiners, succeeding Dr. E. T. Hallman (A. P. I. '10), resigned.

Dr. Karl A. Trish (O. S. U. '14), who has been stationed at Fort Atkinson, Wis., for a number of years, as a member of the Milwaukee staff of the B. A. I., has resigned to accept a position with the city of Kenosha, Wis.

Dr. William R. Hinshaw (Mich. '23) has resigned his position in the Department of Bacteriology, Kansas State Agricultural College, to accept an appointment to the staff of the Massachusetts Agricultural College.

Dr. Benjamin Rau (U. P. '25), who has been resident surgeon at the University of Pennsylvania Veterinary Hospital since his graduation, has resigned and located in Jenkintown, Pa., where he will engage in private practice.

Dr. George W. Derrick (Corn. '17) has left Syracuse, N. Y., and gone to Ithaca, N. Y., where he has taken a position at the Experiment Station of the New York State Veterinary College. Dr. Derrick will also take graduate work at Cornell University.

Dr. M. J. Hughes (N. Y. S. V. C. '20) has accepted a position with the Newark (N. J.) Department of Health, on the force of Dr. Werner Runge (Berlin '79), Chief Veterinarian, Bureau of Meat Inspection. Dr. Hughes is allowed to practice during his spare time.

Dr. Chas. J. Coon (K. S. A. C. '24), who has been at the Virginia Polytechnic Institute the past year, has resigned to accept the position in the Department of Bacteriology at Kansas State Agricultural College made vacant by the resignation of Dr. W. R. Hinshaw (Mich. '23).

Dr. Fred H. Steele (A. P. I. '15), of Huntsville, Ala., was at the Walter Reed General Hospital, Washington, D. C., from May 6 to June 20, where he underwent a successful operation. While in Washington, Dr. Steele received a commission as Captain in the Veterinary Department of the Alabama National Guard.

Dr. C. F. McKinney (T. H. '13) resigned as Coles County (Ill.) Veterinarian, July 1, after serving in this capacity for four years. Coles County was placed on the accredited list, July 1. Dr. McKinney has accepted a position with the Illinois State Department of Agriculture, as traveling inspector of tuberculosis eradication.

Dr. B. L. Strohl (Ind. '08), of Paris, Ill., County Veterinarian of Edgar County, the first accredited county in Illinois, received notification that the County had been re-accredited, June 1, for another three-year period. Beginning September 1, Dr. Strohl will be in charge of both Edgar and Coles counties. He has had charge of Edgar County since August 1, 1923.